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FOOD TECHNOLOGY ABSTRACTS

No. 195

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195

CONTENTS

	Page No
1. General	... 1
2. Food Processing and Packaging	... 1
3. Food Engineering and Equipment	... 2
4. Energy in Food Processing	... 3
5. Food Chemistry and Analysis	... 3
6. Food Laws and Regulations	... -
7. Food Microbiology	... 5
8. Food Additives	... 8
9. Cereals	... 9
10. Millets	... 15
11. Pulses	... 17
12. Oilseeds and Nuts	... 20
13. Tubers and Vegetables	... 24
14. Fruits	... 32
15. Sugar, Starch and Confectionery	... 42
16. Bakery Products	... 44
17. Milk and Dairy Products	... 46
18. Meat and Poultry	... 50
19. Seafoods	... 59
20. Protein Foods	... 65
21. Fruit Juices and Beverages	... 66
22. Oils and Fats	... 69
23. Spices and Condiments	... 73
24. Sensory Evaluation	... 74
25. Food Storage	... -
26. Infestation Control and Pesticides	... 75
27. Biochemistry and Nutrition	... 77
28. Toxicology and Hygiene	... 79
Index	

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195

CONTENTS

	Page No
1. General	... 83
2. Food Processing and Packaging	... 84
3. Food Engineering and Equipment	... 86
4. Energy in Food Processing	... 87
5. Food Chemistry and Analysis	... 87
6. Food Laws and Regulations	... -
7. Food Microbiology	... 90
8. Food Additives	... 93
9. Cereals	... 97
10. Millets	... 103
11. Pulses	... 105
12. Oilseeds and Nuts	... 108
13. Tubers and Vegetables	... 112
14. Fruits	... 118
15. Sugar, Starch and Confectionery	... 125
16. Bakery Products	... 125
17. Milk and Dairy Products	... 129
18. Meat and Poultry	... 132
19. Seafoods	... 139
20. Protein Foods	... -
21. Fruit Juices and Beverages	... 144
22. Oils and Fats	... 149
23. Spices and Condiments	... 152
24. Sensory Evaluation	... 153
25. Food Storage	... 154
26. Infestation Control and Pesticides	... 154
27. Biochemistry and Nutrition	... 156
28. Toxicology and Hygiene	... 157
Index	

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5. The Government and the People

6. The Government and the People

7. The Government and the People

8. The Government and the People

9. The Government and the People

10. The Government and the People

11. The Government and the People

12. The Government and the People

13. The Government and the People

14. The Government and the People

15. The Government and the People

16. The Government and the People

17. The Government and the People

18. The Government and the People

19. The Government and the People

20. The Government and the People

21. The Government and the People

22. The Government and the People

23. The Government and the People

24. The Government and the People

25. The Government and the People

26. The Government and the People

27. The Government and the People

28. The Government and the People

The Government and the People

The Government and the People

The Government and the People

The Government and the People

CONTENTS

	Page No
1. General	... 161
2. Food Processing and Packaging	... 161
3. Food Engineering and Equipment	... 163
4. Energy in Food Processing	... 163
5. Food Chemistry and Analysis	... 164
6. Food Laws and Regulations	... 165
7. Food Microbiology	... 165
8. Food Additives	... 166
9. Cereals	... 168
10. Millets	... 171.
11. Pulses	... 174
12. Oilseeds and Nuts	... 177
13. Tubers and Vegetables	... 181
14. Fruits	... 187
15. Sugar, Starch and Confectionery	... 191
16. Bakery Products	... 193
17. Milk and Dairy Products	... 194
18. Meat and Poultry	... 198
19. Seafoods	... 204
20. Protein Foods	... -
21. Fruit Juices and Beverages	... 207
22. Oils and Fats	... 212
23. Spices and Condiments	... 214
24. Sensory Evaluation	... 215
25. Food Storage	... -
26. Infestation Control and Pesticides	... 215
27. Biochemistry and Nutrition	... 216
28. Toxicology and Hygiene	... 218
Index	

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CONTENTS

	Page No
1. General	... 221
2. Food Processing and Packaging	... 221
3. Food Engineering and Equipment	... 223
4. Energy in Food Processing	... 224
5. Food Chemistry and Analysis	... 224
6. Food Laws and Regulations	... -
7. Food Microbiology	... 226
8. Food Additives	... 228
9. Cereals	... 229
10. Millets	... 232
11. Pulses	... 233
12. Oilseeds and Nuts	... 235
13. Tubers and Vegetables	... 237
14. Fruits	... 243
15. Sugar, Starch and Confectionery	... 248
16. Bakery Products	... 249
17. Milk and Dairy Products	... 251
18. Meat and Poultry	... 254
19. Seafoods	... 258
20. Protein Foods	... -
21. Fruit Juices and Beverages	... 265
22. Oils and Fats	... 269
23. Spices and Condiments	... 271
24. Sensory Evaluation	... 272
25. Food Storage	... -
26. Infestation Control and Pesticides	... 272
27. Biochemistry and Nutrition	... 273
28. Toxicology and Hygiene	... 274
Index	

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198

CONTENTS

	Page No
1. General	... 275
2. Food Processing and Packaging	... 275
3. Food Engineering and Equipment	... 277
4. Energy in Food Processing	... 278
5. Food Chemistry and Analysis	... 278
6. Food Laws and Regulations	... 280
7. Food Microbiology	... 280
8. Food Additives	... 282
9. Cereals	... 284
10. Millets	... 290
11. Pulses	... 291
12. Oilseeds and Nuts	... 293
13. Tubers and Vegetables	... 297
14. Fruits	... 299
15. Sugar, Starch and Confectionery	... 303
16. Bakery Products	... 305
17. Milk and Dairy Products	... 307
18. Meat and Poultry	... 311
19. Seafoods	... 317
20. Protein Foods	... -
21. Fruit Juices and Beverages	... 319
22. Oils and Fats	... 323
23. Spices and Condiments	... 328
24. Sensory Evaluation	... 329
25. Food Storage	... -
26. Infestation Control and Pesticides	... 331
27. Biochemistry and Nutrition	... 331
28. Toxicology and Hygiene	... 333
Index	

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199

CONTENTS

	Page No
1. General	... 335
2. Food Processing and Packaging	... 335
3. Food Engineering and Equipment	... 335
4. Energy in Food Processing	... -
5. Food Chemistry and Analysis	... 336
6. Food Laws and Regulations	... 337
7. Food Microbiology	... 338
8. Food Additives	... 340
9. Cereals	... 341
10. Millets	... 345
11. Pulses	... 347
12. Oilseeds and Nuts	... 349
13. Tubers and Vegetables	... 352
14. Fruits	... 357
15. Sugar, Starch and Confectionery	... 362
16. Bakery Products	... 363
17. Milk and Dairy Products	... 364
18. Meat and Poultry	... 369
19. Seafoods	... 375
20. Protein Foods	... 376
21. Fruit Juices and Beverages	... 377
22. Oils and Fats	... 381
23. Spices and Condiments	... 384
24. Sensory Evaluation	... 385
25. Food Storage	... 385
26. Infestation Control and Pesticides	... 385
27. Biochemistry and Nutrition	... 385
28. Toxicology and Hygiene	... 386
Index	

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CONTENTS	Page No
1. General	... 389
2. Food Processing and Packaging	... 389
3. Food Engineering and Equipment	... 390
4. Energy in Food Processing	... 390
5. Food Chemistry and Analysis	... 390
6. Food Laws and Regulations	... 391
7. Food Microbiology	... 391
8. Food Additives	... 393
9. Cereals	... 394
10. Millets	... 398
11. Pulses	... 399
12. Oilseeds and Nuts	... 402
13. Tubers and Vegetables	... 404
14. Fruits	... 407
15. Sugar, Starch and Confectionery	... 412
16. Bakery Products	... 412
17. Milk and Dairy Products	... 416
18. Meat and Poultry	... 420
19. Seafoods	... 428
20. Protein Foods	... -
21. Fruit Juices and Beverages	... 431
22. Oils and Fats	... 438
23. Spices and Condiments	... 442
24. Sensory Evaluation	... 443
25. Food Storage	... -
26. Infestation Control and Pesticides	... 444
27. Biochemistry and Nutrition	... 445
28. Toxicology and Hygiene	... 447
Index	

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201

CONTENTS	Page No
1. General	... 451
2. Food Processing and Packaging	... 452
3. Food Engineering and Equipment	... 453
4. Energy in Food Processing	... -
5. Food Chemistry and Analysis	... 454
6. Food Laws and Regulations	... 456
7. Food Microbiology	... 456
8. Food Additives	... 461
9. Cereals	... 467
10. Millets	... 470
11. Pulses	... 473
12. Oilseeds and Nuts	... 476
13. Tubers and Vegetables	... 480
14. Fruits	... 486
15. Sugar, Starch and Confectionery	... 490
16. Bakery Products	... 491
17. Milk and Dairy Products	... 493
18. Meat and Poultry	... 498
19. Seafoods	... 504
20. Protein Foods	... -
21. Fruit Juices and Beverages	... 509
22. Oils and Fats	... 515
23. Spices and Condiments	... 520
24. Sensory Evaluation	... 521
25. Food Storage	... -
26. Infestation Control and Pesticides	... 522
27. Biochemistry and Nutrition	... 525
28. Toxicology and Hygiene	... 529

Index

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202

CONTENTS

	Page No
1. General	... 533
2. Food Processing and Packaging	... 534
3. Food Engineering and Equipment	... 534
4. Energy in Food Processing	... -
5. Food Chemistry and Analysis	... 535
6. Food Laws and Regulations	... -
7. Food Microbiology	... 536
8. Food Additives	... 538
9. Cereals	... 540
10. Millets	... 545
11. Pulses	... 548
12. Oilseeds and Nuts	... 550
13. Tubers and Vegetables	... 553
14. Fruits	... 556
15. Sugar, Starch and Confectionery	... 558
16. Bakery Products	... 560
17. Milk and Dairy Products	... 563
18. Meat and Poultry	... 568
19. Seafoods	... 573
20. Protein Foods	... -
21. Fruit Juices and Beverages	... 576
22. Oils and Fats	... 578
23. Spices and Condiments	... 581
24. Sensory Evaluation	... 582
25. Food Storage	... -
26. Infestation Control and Pesticides	... 583
27. Biochemistry and Nutrition	... 584
28. Toxicology and Hygiene	... 586
Index	

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Please write to:

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CONTENTS	Page No
1. General	... 591
2. Food Processing and Packaging	... 593
3. Food Engineering and Equipment	... 595
4. Energy in Food Processing	... 595
5. Food Chemistry and Analysis	... 595
6. Food Laws and Regulations	... -
7. Food Microbiology	... 596
8. Food Additives	... 600
9. Cereals	... 602
10. Millets	... 605
11. Pulses	... 607
12. Oilseeds and Nuts	... 610
13. Tubers and Vegetables	... 613
14. Fruits	... 616
15. Sugar, Starch and Confectionery	... 620
16. Bakery Products	... 621
17. Milk and Dairy Products	... 623
18. Meat and Poultry	... 626
19. Seafoods	... 631
20. Protein Foods	... -
21. Fruit Juices and Beverages	... 633
22. Oils and Fats	... 640
23. Spices and Condiments	... 641
24. Sensory Evaluation	... 642
25. Food Storage	... 642
26. Infestation Control and Pesticides	... 643
27. Biochemistry and Nutrition	... 644
28. Toxicology and Hygiene	... 646
Index	

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904

CONTENTS

	Page No
1. General	... 649
2. Food Processing and Packaging	... 649
3. Food Engineering and Equipment	... 649
4. Energy in Food Processing	... -
5. Food Chemistry and Analysis	... 649
6. Food Laws and Regulations	... -
7. Food Microbiology	... 650
8. Food Additives	... 653
9. Cereals	... 655
10. Millets	... 659
11. Pulses	... 661
12. Oilseeds and Nuts	... 665
13. Tubers and Vegetables	... 668
14. Fruits	... 672
15. Sugar, Starch and Confectionery	... 674
16. Bakery Products	... 676
17. Milk and Dairy Products	... 677
18. Meat and Poultry	... 679
19. Seafoods	... 685
20. Protein Foods	... -
21. Fruit Juices and Beverages	... 689
22. Oils and Fats	... 695
23. Spices and Condiments	... 698
24. Sensory Evaluation	... 699
25. Food Storage	... -
26. Infestation Control and Pesticides	... 699
27. Biochemistry and Nutrition	... 700
28. Toxicology and Hygiene	... 703
Index	

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CONTENTS

	Page No
1. General	... 707
2. Food Processing and Packaging	... 708
3. Food Engineering and Equipment	... 708
4. Energy in Food Processing	... 709
5. Food Chemistry and Analysis	... 709
6. Food Laws and Regulations	... -
7. Food Microbiology	... 711
8. Food Additives	... 714
9. Cereals	... 714
10. Millets	... 718
11. Pulses	... 719
12. Oilseeds and Nuts	... 721
13. Tubers and Vegetables	... 723
14. Fruits	... 727
15. Sugar, Starch and Confectionery	... 732
16. Bakery Products	... 733
17. Milk and Dairy Products	... 734
18. Meat and Poultry	... 737
19. Seafoods	... 742
20. Protein Foods	... 747
21. Fruit Juices and Beverages	... 748
22. Oils and Fats	... 752
23. Spices and Condiments	... 757
24. Sensory Evaluation	... 758
25. Food Storage	... -
26. Infestation Control and Pesticides	... 759
27. Biochemistry and Nutrition	... 760
28. Toxicology and Hygiene	.. 761
Index	

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206

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(*Int. Pest Control.*)

International Sugar Journal
(*Int. Sugar J.*)

Invention Intelligence
(*Invent. Intell.*)

Irish Journal of Agricultural Economics
(*Ir. J. Agric. Econ.*)

Irish Journal of Food Science and
Technology
(*Ir. J. Food Sci. Technol.*)

ISI Bulletin
(*ISI Bull.*)

Israel Journal of Technology
(*Isr. J. Technol.*)

Japan Pesticide Information
(*Jpn. Pestic. Inf.*)

JARQ (Japan Agricultural Research
Quarterly)
(*JARQ*)

Journal of Agricultural and Food
Chemistry
(*J. Agric. Food Chem.*)

Journal of Agricultural Engineering
(*J. Agric. Eng.*)

Journal of Agricultural Engineering
Research
(*J. Agric. Eng. Res.*)

Journal of the American Dietetic Asso-
ciation
(*J. Am. Dietet. Assoc.*)

Journal of the American Oil Chemists
Society
(*J. Am. Oil Chem. Soc.*)

Journal of the American Society for
the Horticultural Science
(*J. Am. Soc. Hortic. Sci.*)

Journal of Animal Science
(*J. Anim. Sci.*)

Journal of Applied Biochemistry
(*J. Appl. Biochem.*)

Journal of the Association of Official
Analytical Chemists
(*J. Assoc. Off. Anal. Chem.*)

Journal of the Association of Public
Analysts
(*J. Assoc. Public Anal.*)

Journal of Bioscience
(*J. Biosci.*)

Journal of Cereal Science
(*J. Cereal Sci.*)

Journal of Chemical Technology and
Biotechnology
(*J. Chem. Technol. Biotechnol.*)

Journal of Chromatography
(*J. Chromatogr.*)

Journal of Coffee Research
(*J. Coffee Res.*)

Journal of Dairy Research
(*J. Dairy Res.*)

Journal of Dairy Science
(*J. Dairy Sci.*)

Journal of Economic Entomology
(*J. Econ. Entomol.*)

Journal of Fermentation Technology
(*Hakko Kogaku Zasshi*) (Japanese)
(*J. Ferment. Technol.*)

Journal of Food Biochemistry
(*J. Food Biochem.*)

Journal of Food Process Engineering
(*J. Food Process. Eng.*)

Journal of Food Processing and Preservation
(*J. Food Process. Preserv.*)

Journal of Food Protection
(*J. Food Prot.*)

Journal of Food Quality
(*J. Food Qual.*)

Journal of Food Safety
(*J. Food Safety*)

Journal of Food Science
(*J. Food Sci.*)

Journal of Food Science and Technology
(*India*)
(*J. Food Sci. Technol. (India)*)

Journal of Food Technology
(*J. Food Technol.*)

- Journal of General and Applied Microbiology
(J. Gen. Appl. Microbiol.)
- Journal of General Microbiology
(J. Gen. Microbiol.)
- Journal of Horticultural Science
(J. Hortic. Sci.)
- Journal of Hygiene
(J. Hyg.)
- Journal of the Indian Chemical Society
(J. Indian Chem. Soc.)
- Journal of the Indian Institute of Science
(J. Indian Inst. Sci.)
- Journal of Insect Physiology
(J. Insect Physiol.)
- Journal of the Institute of Brewing
(J. Inst. Brew.)
- Journal of the Institution of Chemists (India)
(J. Inst. Chem. (India))
- Journal of Japanese Society of Food Science and Technology (Japanese)
(J. Jpn. Soc. Food Sci. Technol.)
- Journal of the Japanese Society of Starch Science (Japanese)
(J. Jpn. Soc. Starch. Sci.)
- Journal of the National Science Council of Sri Lanka
(J. Nat. Sci. Counc. Sri Lanka.)
- Journal of Nuclear Agriculture and Biology
(J. Nucl. Agric. Biol.)
- Journal of Nutrition
(J. Nutr.)
- Journal of Nutritional Science and Vitaminology
(J. Nutr. Sci. Vitaminol.)
- Journal of the Oil Technologists Association of India
(J. Oil Technol. Assoc. India.)
- Journal of Plantation Crops
(J. Plant Crops.)
- Journal of Plant Foods
(J. Plant Food.)
- Journal of Quality Technology
(J. Qual. Technol.)
- Journal of Root Crops
(J. Root Crops.)
- Journal of the Science of Food and Agriculture
(J. Sci. Food Agric.)
- Journal of Scientific and Industrial Research
(J. Sci. Ind. Res.)
- Journal of the Society of Dairy Technology
(J. Soc. Dairy Technol.)
- Journal of Stored Products Research
(J. Stored Prod. Res.)
- Journal of Texture Studies
(J. Texture Stud.)
- Kenya Coffee
(Kenya Coffee)
- Khadigramodyog
(Khadigramodyog)
- Laboratory Practice
(Lab. Practice)
- Lebensmittel-Industrie (German)
(Lebensmittel-Industrie)
- Lipids
(Lipids)
- Madras Agricultural Journal
(Madras Agric. J.)
- Manufacturing Confectionery
(Manuf. Confect.)
- MBAA Technical Quarterly
(MBAA Tech. Quart.)
- Meat Science
(Meat Sci.)
- Memoirs of Faculty of Fisheries Kagoshima University
(Mem. Fac. Fish. Kagoshima Univ.)
- Milk Industry
(Milk Ind.)
- Milling Feed and Fertiliser
(Milling Feed Fert.)
- Modern Packaging
(Mod. Packag.)
- Muhle + Mischfuttertechnik (German)
(Muhle + Mischfuttertechnik.)

(vii)

- Mushroom Journal
(Mushroom J.)
- Mysore Journal of Agricultural
Sciences
(Mysore J. Agric. Sci.)
- Nahrung (German)
(Nahrung)
- Nature
(Nature)
- Netherlands milk and Dairy Journal
(Neth. Milk Dairy J.)
- New Scientist
(New Sci.)
- New York's Food and Life Sciences
(New York's Food Life Sci.)
- New Zealand Journal of Dairy Science
and Technology
(NZ J. Dairy Sci. Technol.)
- Nutrition Reports International
(Nutr. Rep. Int.)
- Nutrition Reviews
(Nutr. Rev.)
- Oils and Oilseeds Journal
(Oils. Oilseeds J.)
- Oleagineux (French)
(Oleagineux)
- Package Engineering
(Packag. Eng.)
- Packaging
(Packaging.)
- Packaging India
(Packag. India.)
- Packaging Review, U.K.
(Packag. Rev. U.K.)
- PAG Bulletin
(PAG Bull.)
- Pakistan Journal of Science
(Pak. J. Sci.)
- Pakistan Journal of Scientific and
Industrial Research
(Pak. J. Sci. Ind. Res.)
- Pakistan Journal of Scientific
Research
(Pak. J. Sci. Res.)
- Pans
(Pans)
- Paperboard Packaging,
(Paperboard Packag.)
- Peanut Journal and Nut World
(Peanut J. Nut World)
- Peanut Science
(Peanut Sci.)
- Perfectpac
(Perfectpac.)
- Perfumer and Flavorist
(Perfum. Flavor)
- Pest Control
(Pest Control)
- Pesticide Biochemistry and Physiology
(Pestic. Biochem. Physiol.)
- Pesticides
(Pesticides)
- Pesticide Science
(Pesticide Sci.)
- Philippine Journal of Food Science
Technology
(Philipp. J. Food Sci. Technol.)
- Philippine Journal of Nutrition
(Philipp. J. Nutr.)
- Phytochemistry
(Phytochemistry)
- Phytoparasitica
(Phytoparasitica)
- Plant Physiology
(Plant Physiol.)
- Poultry Guide
(Poult. Guide)
- Poultry Science
(Poult. Sci.)
- Poultry Tribune
(Poult. Trib.)
- Proceedings of the All India Sugar
Technologists
(Proc. All India Sugar Technol.)
- Proceedings of the Indian Academy
of Science. Section A
(Proc. Indian Acad. Sci. Sect. A.)
- Proceedings of the Indian Academy
of Sciences. Section B
(Proc. Indian Acad. Sci. Sect. B.)

- Proceedings of the Nutrition Society of India
 (Proc. Nutr. Soc. India.)
- Process Biochemistry
 (Process Biochem.)
- Processed Prepared Food (Canner/Packer)
 (Process. Prep. Food.)
- Process Engineering
 (Process. Eng.)
- Productivity Journal
 (Prod. J.)
- Profodcil Bulletin
 (Profodcil Bull.)
- Progress in Food and Nutrition Science
 (Prog. Food Nutr. Sci.)
- Progressive Horticulture
 (Prog. Hortic.)
- Prumysl Potravin (Czech or Slovak)
 (Prumysl Potravin.)
- Punjab Horticultural Journal
 (Punjab Hortic. J.)
- Qualitas Plantarum
 (Qualitas Plantarum)
- Quick Frozen Foods
 (Quick Frozen Food.)
- Quick Frozen Foods International
 (Quick Frozen Food Int.)
- Report of the National Food Research Institute (Japan)
 (Rep. Nat. Food Res. Inst.)
- Research and Industry
 (Res. Ind.)
- Revista de Agroquimica Y Tecnologia de Alimentos (Spanish)
 (Rev. Agroquim. Technol. Aliment.)
- Rice Journal
 (Rice J.)
- Riechstoffe Aromen Kosmetica (German)
 (Riechstoff. Aromen Kosmet.)
- Science (USA)
 (Science. USA)
- Science and Culture
 (Sci. Cult.)
- Science Progress
 (Sci. Prog.)
- Science Reporter
 (Sci. Rep.)
- Sciences
 (Sciences)
- Sciences Des Aliments (French/English)
 (Sci. Aliment.)
- Scientific American
 (Sci. Am.)
- Scientific World
 (Sci. World.)
- Seafood Export Journal
 (Seafood Export J.)
- Seeds and Farms
 (Seeds. Farms)
- Seed Science and Technology
 (Seed Sci. Technol.)
- Solar Energy
 (Solar Energy)
- Soy Bean Digest
 (Soy Bean Dig.)
- Starke (German)
 (Starke)
- Sudan Journal of Food Science and Technology (Arabic/English)
 (Sudan J. Food Sci. Technol.)
- Swedish Journal of Agricultural Research
 (Swed. J. Agric. Res.)
- Tea and Coffee Trade Journal
 (Tea Coffee Trade. J.)
- Technologia
 (Technologia)
- Technologija Mesa
 (Technol. Mesa.)
- Technology Journal NSDB
 (Technol. J. NSDB)
- Technology Review
 (Technol. Rev.)
- Toxicology
 (Toxicology)
- Tropical Agriculture
 (Trop. Agric.)

Tropical Agriculturist
(Trop. Agriculturist)

Tropical Grain Legume Bulletin
(Trop. Grain Legum. Bull.)

Tropical Stored Products Information
(Trop. Stored Prod. Inf.)

Two and a bud
(Two and a Bud)

Var Foda (Swedish)
(Var Foda)

Voeding (English/French/German)
(Voeding)

WHO Chronical
(WHO Chron.)

World Agriculture
(World Agric.)

World Coffee and Tea
(World Coffee Tea.)

World Crops
(World Crops)

World Health
(World Health)

World's Poultry Science Journal
(World Poult. Sci. J.)

Yojana
(Yojana)

Zeitschrift Fuer Lebensmittel-
Unterschu und Forschung (German)
(Z. Lebensmittel-Unters. Forsch.)

GENERAL

- 1 LEVEILLE (GA). Food fortification opportunities and pitfalls. *Food Technol.* 38(1); 1984; 58-63
- 2 STRACHAN (PW). Optimised quality in frozen foods. *IFST Proc.* 16(2); 1983; 65-74
- 3 RAMANNA (B) and SANGAMESWARAN (SV). User-Oriented Information Services: Role of National Information Centre for Food Science and Technology (NICFOS). *Indian Food Ind.* 2(1); 1983; 10-12
- 4 GANATRA (LV) and GANATRA (VB). Deviations in I.S.I. standards from mandatory standards. *Indian Food Packer.* 37(2); 1983; 54-7
The authors point out with examples, the existing anomalies in the Prevention of Food Adulteration Rules and the standard specifications prescribed by the Indian Standards Institution. BSN

FOOD PROCESSING AND PACKAGING

PROCESSING

- 5 DAUDIN (JD). Calculation of the air-drying kinetics of biological products. *Sci. Aliment.* 3(1); 1983; 1-36 (French)
The author has reviewed the literature dealing with the kinetics of air-drying of biological products, in order to simulate the operation of an industrial drier. Two different approaches to the calculation of the drying kinetics are examined: (i) the "theoretical" approach based on the knowledge of heat and mass transfer, which determine the drying rate and their equations; and (ii) the "experimental approach which consists in formulating a drying law based on the experimental kinetics measured in the laboratory. KMD
- 6 SUTHERLAND (JW), BANKS (PJ) and ELDER (WB). Interaction between successive temperature or moisture fronts during aeration of deep grain beds. *J. Agric. Eng. Res.* 28(1); 1983; 1-19
- 7 CLELAND (AC) and GESTERKAMP (MF). The effect of irregular cooling phenomena on the lethality of thermal processes. *J. Food Technol.* 18(4); 1983; 411-25
- 8 BHOWMIK (SR) and HAYAKAWA (K). Influence of selected thermal processing conditions on steam consumption and on mass average sterilizing values. *J. Food Sci.* 48(1); 1983; 212-6, 225
- 9 LEONARD (S), OSAKI (K) and HEIL (J). Monitoring flame sterilization processes. *Food Technol.* 38(1); 1984; 47-50, 83
The purpose of this research was to address monitoring, record keeping, and process control in flame processing (Steriflamme, Laboratories De St. Georges, Saint Georges Motel (Eure), France) of low-acid foods. Two systems

were evaluated for continuous monitoring and recording of can surface temperatures. These systems could potentially control processes in flame sterilizers on a single-can basis. AA

- 10 MANOHAR RAO (PJ). Practical solution to prevent pollution from distillery effluent (Vinasses). *Indian Sugar*. 33(4); 1983; 247-54
Various methods of effluent disposal and use for obtaining useful products are described. The chemical composition of the effluent; present methods of disposal of distillery effluents including the use of irrigation water, lagooning, concentration and incineration; disposal system of NEM-Vinasse boiler of Holland and Vinasse consumption plants of the Netherlands; and production of methane gas are covered in this review. MVG

PACKAGING

- 11 HICKS (A). The principles of food packaging. *Perfectpac*. 23(2); 1983; 5-10
- 12 DORDI (MC). Packaging of processed foods. *Perfectpac* 23(2); 1983; 11-9
A brief review of the output of the Indian food processing industry - excluding staples like foodgrains, oilseeds, and edible fats - and processed food exports from India over the period 1971-1982. Processing cost has been compared with packaging cost in a tabular form. KMD
- 13 MANNHEIM (CH), ADAN (H) and PASSY (N). External corrosion of cans during thermal treatment. *J. Food Technol.* 18(3); 1983; 285-93
Factors affecting external corrosion of food cans, in contact with various metals in aqueous medium, during thermal processing were investigated. Simple electrochemical measurements of potentials and couple currents were found to be suitable for evaluation of the tendency and extent of corrosion. A stainless steel bath was found to cause external corrosion of tin cans. Several inhibitors were investigated as to their efficiency in minimizing this phenomenon. Two commercial inhibitors were found to have a limited effect, whereas sodium nitrite proved to be effective at a level of 300 ppm. It became apparent that increasing the anodic area (tinplate) in relation to cathodic area (stainless steel), i.e. loading equipment to capacity, was beneficial in reducing corrosion in this system. An aluminium electrode afforded protection to tin cans in a stainless steel bath at 85 C. AA
- 14 HOTCHKISS (JH) and VECCHIO (AJ). Analysis of direct contact paper and paperboard food packaging for N-nitrosomorpholine and morpholine. *J. Food Sci.* 48(1); 1983; 240-42

FOOD ENGINEERING AND EQUIPMENT

- 15 KIRK (RS). Developments in food laboratory instrumentation. *Food Flavour. Ingrid. Packag. Process.* 5(10); 1983; 46-51
Discusses: basic models for smaller labs; feedback from the food line; helping the quality control analyst; analytical laboratory; gas chromatography; and future trends. BSN

ENERGY IN FOOD PROCESSING

- 16 HEM SHANKER RAY. Energy conservation - A reliable alternative source of energy. *Sci. Rep.* 20(6); 1983; 322-6
- 17 ANON. Biomass energy. *Solar energy.* 30(1); 1983; 1-31

FOOD CHEMISTRY AND ANALYSIS

- 18 MURTHY (MSS), DEORUKHAKAR (VV) and ANJARIA (KB). A study of the induction of gene conversion in yeast by sodium bisulphite under radical reaction conditions. *Food Chem. Toxicol.* 21(4); 1983; 499-501
Sodium bisulphite (NaHSO_3) at low concentrations is known to undergo radical reactions in the presence of Mn^{2+} ions, generating sulphite anion radicals ($\text{SO}_3^\cdot$). The kinetics of pH variation in aqueous solutions of NaHSO_3 in the presence of 0.1 mM- MnSO_4 suggests that the anion radicals are generated rapidly at low bisulphite concentration (10 mM) and quenched at a higher concentration (100 mM). The ability of NaHSO_3 to induce gene conversion in the diploid yeast *Saccharomyces cerevisiae* BZ34 under conditions suitable for radical reactions has been investigated. The results show that NaHSO_3 does not induce gene conversion under these conditions. AA
- 19 FODA (YH), ABD ALLAH (MA), AHMED (AK), EL-MINYAWI (MA) and EL-GEDAILY (AA). Rheological characteristics of pectin and sodium carboxymethyl cellulose. *Starch.* 35(4); 1983; 133-9
The dynamic viscosities of pectin and sodium carboxymethyl cellulose (SCMC) were determined in the presence of 60 and 70% sugar concentration. The effect of dissolving citric acid, after or before the complete dissolution of pectin and sodium carboxymethyl cellulose on the dynamic viscosity were also investigated. AA
- 20 TAKANASHI (H), AISO (AS) and HIRONO (I). Carcinogenicity test of quercetin and kaempferol in rats by oral administration. *J. Food Safety.* 5(2); 1983; 55-60
- 21 FOX (M), LONCIN (M) and WEISS (M). Investigations into the influence of water activity, pH and heat treatment on the breakdown of 5'-ribonucleotides in foods. *J. Food Quality.* 6(1); 1983; 11-27
From the data, one can see the strong influence of the time and temperature of the heat treatment, the lesser but still significant influence of pH, and the lack of influence of water activity on the breakdown of the 5'-ribonucleotide in the model product. KAR
- 22 LENART (A) and FLINK (JM). An improved proximity equilibration cell method for measuring water activity of foods. *Food Sci. + Technol.* 16(2); 1983; 84-9
- 23 OBREtenov (TD), ARGIROV (OG) and RASHKOV (IB). On melanoidin formation with furfural participation: Synthesis of melanoidins from furfural and glycine. *J. Food Process. Preserv.* 7(2); 1983; 105-13

- 24 OBRETEVOV (TD), ARGIROV (OK) and RASHKOV (IB). On melanoidin formation with furfural participation: Initial step of the reaction of furfural with glycine esters. *J. Food Process. Preserv.* 7(2); 1983; 115-26
- 25 KOTSARIDU (M), GEHLE (R) and SCHUGERL (K). Foam behaviour of biological media. IX. pH and salt effects. *European J. Appl. Microbiol. Biotechnol.* 18(1); 1983; 60-63
The influence of the concentrations of NaCl, NaJ, KJ and/or Na₂SO₄ on the foaminess of BSA solutions is investigated. The foaminess increases with increasing salt concentrations as expected for NaCl, NaJ and Na₂SO₄. With KJ the foaminess exhibits an anomaly. The dependence of the foaminess on the pH is complex. In the presence of buffer there is a minimum at 4.81 and a maximum at 4.7. In the absence of buffer the foaminess reaches a maximum at pH 4 and a minimum at 3. The anomaly of BSA solutions is well-known but not yet fully understood. AA
- 26 NAKAI (S). Structure-function relationships of food proteins with an emphasis on the importance of protein hydrophobicity. *J. Agric. Food Chem.* 31(4); 1983; 676-83
Discusses; determination of protein hydrophobicity; emulsifying ability; foaming ability; thermal functional properties; hydrophobicity-HLD-polarity relationship; secondary structure of protein molecules; higher orders structures of protein molecules; chemical forces; modification of proteins; and statistical considerations. BSN
- 27 GRAF (E). Calcium binding to phytic acid. *J. Agric. Food Chem.* 31(4); 1983; 851-5
- 28 VOUTSINAS (LP), CHEUNG (E) and NAKAI (S). Relationships of hydrophobicity to emulsifying properties of heat denatured proteins. *J. Food Sci.* 48(1); 1983; 26-32
- 29 KATO (A), TAKAHASHI (A), MATSUDOMI (N) and KOBAYASHI (K). Determination of foaming properties of proteins by conductivity measurements. *J. Food Sci.* 48(1); 1983; 62-5
A new conductivity method was established which gave close correlation between initial conductivity of foams and foam volumes of heat-denatured ovalbumin or 11 native proteins pointing out the possibility of using initial conductivity as a measure of foaming power. Correlation was also obtained between foam stability and foam volume with time of heat-denatured ovalbumins or 11 native proteins, indicating that changes in the conductivity of foams might also be used for determining foam stability. The method is simpler and more accurate than those used currently. MVG
- 30 EINARSSON (H), SNYGG (BG) and ERIKSSON (C). Inhibition of bacterial growth by Maillard reaction products. *J. Agric. Food Chem.* 31(5); 1983; 1043-7
- 31 NAFISI (K) and MARKAKIS (P). Inhibition of sugar-amine browning by aspartic and glutamic acids. *J. Agric. Food Chem.* 31(5); 1983; 1115-7
- 32 GARCIA-MORENO (C), RIVAS-GONZALO (JC), PENA-EGIDO (MJ) and MARINE-FONT (A). Improved methods for determination and identification of serotonin in foods. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 115-7

- 33 GOMBOCZ (E) and PETUELY (F). Immunoturbidimetry in food analysis: Criteria for the utility of antisera and auxiliary agents. *Z. Lebensmittel-Unters Forsch.* 177(1); 1983; 2-7 (German)
- 34 MARTIN (GJ), MARTIN (ML), MABON (F) and BRICOUT (J). Natural abundance deuterium NMR. A new method of identification of the origin of food products applied to the recognition of anetholes and estragoles. *Sci. Aliment.* 3(1); 1983; 147-55 (French)
- It is shown that large variations may exist in the natural internal distribution of deuterium as a function of the origin of the compound, and that quantitative ^2H NMR is capable of establishing a photography of this intramolecular isotopic distribution. The example of the identification of estragole samples extracted from fennel, Chinese anise-tree, and turpentine, and of anetholes obtained from fennel, Chinese anise-tree, isomerization of turpentine estragole, and chemical synthesis from anisole, is particularly demonstrative. AA
- 35 LEBEL (GL) and WILLIAMS (DT). Problems in collection of representative samples for determination of tributylxethyl phosphate in potable water. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 202-3

FOOD LAWS AND REGULATIONS

Nil

FOOD MICROBIOLOGY

- 36 HENNLICH (W), BECKER (K) and CERNY (G). Rapid method for indirect determination of total microbial counts in perishable foods. *Z. Lebensmittel-Unters. Forsch.* 177(1); 1983; 11-4 (German)
- A method is presented for the determination in one hour of aerobic microorganisms (Total Plate Count) in food in the range between 10^4 and 10^7 bacteria per ml respectively g. This method was developed mainly for rapid microbial analysis of perishable foodstuffs. The method operates by polarographic measurement of oxygen consumption in a tight cell, filled with the liquid product to be evaluated. The correlations between microbial counts and oxygen consumption rates are shown for samples of pasteurized milk and semi-liquid egg. AA
- 37 MANONMANI (HK), SHAMALA (TR) and SREEKANTIAH (KR). Development of an α -amylase production medium by utilising Agro-industrial wastes. *J. Food Sci. Technol. (India)* 20(4); 1983; 168-71
- Aspergillus oryzae* (CFTRI 1120) producing α -amylase was grown on wheat bran, tapioca starch (TS), Tapioca starch refuse (TSR), rice straw, corn starch, water hyacinth, groundnut meal (GM), rice bran (RB) or the combination of TSR, TS, GM and RB with a substrate concentration of 1-5%. Maximum enzyme yield (325-424 units/ml) was obtained with the TSR, GM and RB combined medium after 120 hours. Isopropanol was found to be the best precipitating agent and the powder obtained possessed α -amylase activity of 151 units/mg. KAR

- 38 BLOCHER (JC) and BUSTA (FF). Bacterial spore resistance to acid. *Food Technol.* 37(11); 1983; 87-99

A review of information and data on the effects of acids on bacterial spores and the possible methods of inhibition. Species associated with food quality and safety have received primary attention. It highlights the conversion of spores to cells, growth of spore forming bacteria, survival of spores, factors affecting spore resistance (type of acidulant, water activity, redox potential, and reducing agents), interactions with other treatments (heat treatment, nitrite, EDTA, fatty acids, nicin and sanitizers) and *Clostridium* growth at pH less than 4.6. JVS

- 39 FOEGEDING (PM). Bacterial spore resistance to chlorine compounds. *Food Technol.* 37(11); 1983; 100-104

The review mainly discusses the sporicidal activity of hypochlorites and other free available compounds used in food industry sanitation. Factors affecting sporicidal activity (free vs. combined available chlorine, effect of free available chlorine pH, other affectors of chlorine activity, other chlorine compounds, concentration, time and temperature), comparative resistance to chlorine compounds, mechanism of sporicidal activity, sublethal damage of spores and use of chlorine compounds to sanitizers have received comprehensive coverage. JVS

- 40 GOMBAS (DE). Bacterial spore resistance to heat. *Food Technol.* 37(11); 1983; 105-8

This review discusses the spore structure, alteration of heat resistance under different conditions, mechanism of heat resistance, spore injury and repair. JVS

- 41 STEVENSON (KE) and SHAFER (BD). Bacterial spore resistance to hydrogen peroxide. *Food Technol.* 37(11); 1983; 111-4

The review covers: factors affecting resistance (hydrogen peroxide temperature, pH, ions, ultrasonic waves, UV radiation, inherent resistance), mode of action (hydroxyl ions and changes induced by H_2O_2), injury and recovery and use of aseptic systems. JVS

- 42 COOK (FK) and PIERSON (MD). Inhibition of bacterial spores by antimicrobials. *Food Technol.* 37(11); 1983; 115-26

A review covering the : different phases of transformation of spores to cells, methods of inhibition appraisal, resistance of spores to antimicrobials (sodium chloride, nitrite, sorbate, EDTA, alcohols, parabens, phenolic antioxidants, other additives), sensitivity to chemicals, mechanisms of germination inhibition, chemically injured spores, and the need for more research on mechanisms. JVS

- 43 DOORES (S). Bacterial spore resistance species of emerging importance. *Food Technol.* 33(11); 1983; 127-33

Review of taxonomy, physiology, incidence from food environment, metabolism, spore formation, heat resistance and detection methods of *Disulfotomaculum nigrificans* and *Sporolactobacillus inulinus*. JVS

YEAST

- 44 CALL (HP) and EMEIS (CC). Characterization of an 'Endopolygalacturonase' of the yeast *Kluyveromyces marxianus*. *J. Food Biochem.* 7(2); 1983; 59-85

- 45 IRVALI (N) and WINDISCH (S). Studies on *Saccharomyces* hybrids as yeasts for long-lasting baked goods - The problem of breeding for maintenance of output. *Gordian.* 83(4); 1983; 71-3 (German)

Yeast propagation experiments were carried out in small fermenters, and the leavening power of the harvested yeast was immediately tested, in order to find out how the performance of new, special, baker's yeasts can be influenced by the conditions of growth. Factors that were found to influence the yeast's performance are: (i) composition and concentration of the nutrient solution, (ii) intensity of aeration, and (iii) the growth phase of the cultures from which the yeast was harvested. KMD

- 46 SRINIVASA RAO (PN), BASAPPA (SC), LEWIS (YS) and RAMANATHAN (PK). Effect of some process parameters on production of active dry baker's yeast. *J. Food Sci. Technol. (India)* 20(4); 1983; 171-3

Effect of fermentation time, number of stages of cultivation, and drying conditions on production of active dry yeast (ADY) was studied in (i) 2-5 and (ii) 25 kg batches. Harvesting yeast after fermentation for 20 hours in (i) and 22 hours in (ii) and growing in 4 stages was found sufficient to get ADY. After separating the broth in a nozzle centrifuge, conditioning of the cream in 3% sugar for 10 hours gave added benefits. Among the drying methods studied, like cross flow, truck drier, batch through flow drier and fluidised bed drier, batch through flow drier was found suitable for small scale operations, and fluidised bed with an operating temperature of 45 C was found optimum for large scale drying. KAR

- 47 STEINKRAUS (KH). Traditional food fermentations as industrial resources. *Indian Food Ind.* 2(1); 1983; 3-9

MUSHROOM

- 48 LINDROTH (S), STRANDBERG (E), PESSA (A) and PELLINEN (MJ). A study on the growth potential of *Staphylococcus aureus* in *Boletus edulis*, a wild edible mushroom, prompted by a food poisoning outbreak. *J. Food Sci.* 48(1); 1983; 282-3

- 49 MacFALL (JS), BEAN (GA) and DEAHL (KL). Occurrence of *Aspergillus* spp. and aflatoxins in commercial mushroom compost. *J. Food Technol.* 18(3); 1983; 335-43

One hundred and thirty-three isolates of *Aspergillus* spp. were collected from commercial mushroom houses. Aflatoxins were detected in three samples of compost. Seventy-three per cent of the isolates produced aflatoxins in liquid media. Aflatoxins were produced on sterilized and pasteurized compost plus the components of compost including rye grain, corn cobs and commercial spawn; 24 C was a more favourable temperature for aflatoxins than 14 C. Aflatoxin production varied with isolate, substrate and temperature and ranged from no aflatoxins to all four aflatoxins B₁, B₂, G₁ and G₂. AA

- 50 MEIER-BRATSCHI (A), CARDEN (BM), LUTHY (J), LUTZ (WK) and SCHLATTER (C). Methylation of deoxyribonucleic acid in the rat by the mushroom poison gyromitrin. *J. Agric. Food Chem.* 31(5); 1983; 1117-20

FOOD ADDITIVES

- 51 THOMAS (M) and HUGHES (RE). A relationship between ascorbic acid and threonic acid in Guinea-pigs. *Food Chem. Toxicol.* 21(4); 1983; 449-52
Threonic acid is a major breakdown product of ascorbic acid used as a food additive. When administered orally to guinea-pigs (100 mg/kg body weight) for periods of 4 or 28 days, it produced a significant fall in the ascorbic acid concentration of certain organs, but was without effect on other physiological and biochemical characteristics. The lifespan of scorbutic guinea-pigs was significantly reduced by dietary threonic acid (100 mg/kg body weight). The results indicate that threonic acid may modify the metabolism of ascorbic acid in guinea-pigs. AA
- 52 LINDSAY (RC). Flavour ingredient technology. *Food Technol.* 38(1); 1984; 76-81
This article will discuss classifications, forms, technologies, and evaluation of flavour ingredients. AA
- 53 MOSANDL (A). On synthetic aroma substances. II. Structure and odour of some substituted glycidic esters. *Z. Lebensmittel-Unters. Forsch.* 177(1); 1983; 41-7 (German)
Geometric isomers of some substituted glycidic esters were separated by liquid chromatography. Structure elucidation was carried out by ¹H- and ¹³C-NMR spectroscopy. The odour quality of E-isomers is not specific, Z-isomers exhibit a fruity flavour. AA
- 54 KIMURA (K), NISHIMURA (H), IWATA (I) and MIZUTANI (J). Deterioration mechanism of lemon flavour. 2. Formation mechanism of off-odour substances arising from citral. *J. Agric. Food Chem.* 31(4); 1983; 801-4
- 55 MEGGOS (HN). Colours-key food ingredients. *Food Technol.* 38(1); 1984; 70; 73-4
Regulatory history of food colours in U.S.A., types of colour additives, role played by colours and anticipated developments on the use of colours. JVS
- 56 KUHNERT (P). Food colours, their numbers and synonyms. *Gordian.* 83(4); 1983; 68-70 (German)
The name and EEC number, common German and English synonyms, the colour Index 1977 or CAS-number, DFG & US numbers, and the ADI-value of 39 common food colours have been listed in a table. KMD
- 57 FOGG (AG). and SUMMAN (AM). Further differential-pulse polarographic and visible spectrophotometric studies of the degradation of permitted synthetic food colouring matters with and without the addition of ascorbic acid. Degradation in the dark and in the light without the stabilising action of EDTA. *Analyst.* 108(1292); 1983; 1339-44
In the presence of ascorbic acid, and in the absence of EDTA, food colouring matter degraded extensively over a period of several days. The

significantly high concentration of ascorbic acid used degraded in a similar time as required for disappearance of colour of food colouring matter. As such, simple amines formed, particularly, naphthionic acid remained in significant amounts. Red 2G degraded to Red 10B by deacytation, which is however, stable to attack by ascorbic acid. Black PN degraded initially to a coloured product, which could either be a deacetylated derivative of black PN or a mona 20 compound. Ascorbic acid solution on storage in dark, turned yellow and gave an unidentified product at a polarographic reduction wave at -0.90V (versus S.C.E.) and pH 5.5. BSN

- 58 SALAGOITY-AUGUSTE (M-H), BERTRAND (A) and SUDRAUD (P). Determination of several synthetic dyes in various drinks and food-stuffs by high pressure liquid chromatography. *Sci. Aliment.* 3(1); 1983; 127-36 (French)

The separation of synthetic water-soluble dyes can be carried out by means of ion pair high pressure liquid chromatography; with this method, it is possible to determine the concentration of different yellow, orange, red and blue food dyes with a precision of about 8%. Liquid samples are directly injected in the chromatograph; for solid foods, an extraction with water is necessary. AA

CEREALS

- 59 BEHUE (M), ROQUEBERT (M-F), POISSON (J) and DROUET (H). Bran microflora choice of a counting method, microflora identification. *Sci. Aliment.* 3(1); 1983; 117-26 (French)

Several procedures for the preparation of the original suspension (chosen amongst the most currently used ones) have been tested to evaluate the microflora of the bran. Differences among the methods are related to the mode of homogenisation. Similar quantitative results are obtained with original suspension (40 g bran/400 ml solution) homogenised by Stomacher 400, Waring-Blendor and stirring (160/minutes). The microflora is representative of those commonly found in grains. AA

- 60 KNORR (D) and BETSCHART (AA). Effect of dehydration methods on the functionality of plant protein concentrates. *Starch.* 35(1); 1983; 23-8

The significance of different dehydration methods for rice bran protein and soy protein coagulates on composition and functionality of the resulting protein concentrates was investigated. Minor compositional differences were found between the freeze-, spray- or drum-dried samples. Protein solubility data indicated limited effects of dehydration methods on heat coagulated samples, but significant reduction of protein solubility by drum drying was found in the case of soy protein coagulated at room temperature. Water absorption capacity and emulsion properties were significantly affected by dehydration methods, but no consistent trends could be observed for fat absorption capacity. A significant increase of specific bread loaf volume, relaxation time of doughs and in some cases deformation of protein fortified samples was detected from freeze-dried to drum-dried samples. In general, the effects of dehydration methods on protein functionality were more consistent for heat coagulated rice bran protein than for soy protein concentrates processed at ambient temperatures. AA

- 61 ROY (RB) and MERTEN (JJ). Evaluation of urea-acid system as medium of extraction for the B-group vitamins. Part II. Simplified, semi-automated chemical analysis for niacin and niacinamide in cereal products. *J. Assoc. Off. Anal. Chem.* 66(2); 1983; 291-6

Samples of cereals, and other selected food products, were treated with 1N HCl in the presence of urea, and autoclaved for 30 minutes at 15 psi. Extracts were diluted to a known volume, filtered, and analyzed. The analytical results obtained for niacin were compared with values obtained by the A.O.A.C. method 43.044. In general, the urea-acid extraction system was simple and straightforward, with an efficiency comparable to the A.O.A.C. method. The analytical manifold designed uses fewer modules, gives nett absorbance readings from sample and blank, and can analyze 50 samples per hour. KMD

- 62 DORING (U). Colour detection of insects and insect fragments in cereal products - Filth test. *Gordian.* 83(4); 1983; 62,65-6 (German)

Insect fragments in cereal products have been detected selectively, by a rapid method which involves the use of residues in an alkaline medium and which combines an uptake (dissolution) and a colouring procedure. Only one reaction vessel is used for this test, so that the loss of animal impurities during the analytical procedure is avoided. The new method is more time-saving and economical than the method described in the 7th edition of Cereal Laboratory Methods. The filters have been made transparent, so that complete automation and opto-electronic measurement of the coloured animal residues is now possible. KMD

- 63 LUCKE (E). What causes contamination of cereals with insect fragments? *Gordian.* 83(4); 1983; 67 (German)

- 64 DAFT (JL). Gas chromatographic determination of fumigant residues in stored grains, using isooctane partitioning and dual column packings. *J. Assoc. Off. Anal. Chem.* 66(2); 1983; 228-33

Fumigants were leached from the grain samples, with the official AOAC method, using acetone-water (5+1). They were then partitioned from the leachate with iso-octane, yielding a dry, stable extract that was analyzed by GC. Fortified sample recoveries ranged from 90 to 100%. Two GC columns were used: 20% OV-101 and 20% OV-225/20% OV-17 (2+1). These columns gave dissimilar retention profiles and baseline resolution for the 7 fumigants investigated, viz: chloroform, ethylene dichloride, carbon tetrachloride, trichloroethylene, chloropicrin, ethylene dibromide, and tetrachloroethylene. Further tests showed that grain samples could be screened for fumigant residues by direct injection of the acetone-water leachates obtained using the AOAC method. KMD

- 65 OSBORNE (BG) and FEARN (T). Collaborative evaluation of universal calibrations for the measurement of protein and moisture in flour by near infrared reflectance. *J. Food Technol.* 18(4); 1983; 453-60

PADDY

- 66 SRINIVAS (T), VASUDEV SINGH, BHASYAM (MK) and DESIKACHAR (HSR). Preservation of high moisture paddy with common salt. *J. Food Sci. Technol. (India)* 20(4); 1983; 174-5

High moisture paddy (HMP) harvested in rainy season containing about 37% moisture, was mixed with common salt at 1-6% levels before being stored at room temperature (25-26 C) and RH of 85-90%. It was found that this paddy could be stored in gunny bag or in heap for 2 months by mixing with salt at 2.5% level and at 5% salt concentration for 3 months. Milled rice from the salt mixed paddy contained <1% salt, which did not effect its acceptance by consumers. KAR

RICE

- 67 KRISHNAMURTHY (VV) and SREERAMULU (US). Studies on rice bran and rice bran oil. IV. Some aspects of the nutritive value of rice bran. *Madras Agric. J.* 69(8); 1983; 540-42
Raw bran from 30 varieties of paddy were studied for crude protein content and yield, oil content, neutral and acid detergent fibre, acid detergent lignin, silica and digestible dry matter (DDM). There were wide variations in the above parameters among the varieties. Results showed that, 6 varieties (i.e. CO36, IR 28, TNAU 15776/3, TNAU 4372, TNAU 18660 and TNAU 13613) were considered superior in terms of nutritive value. MVG
- 68 VATANA (P) and DEL ROSARIO (RR). Biochemical changes in fermented rice - shrimp (*Macrobrachium idella*) mixture; changes in protein fractions. *Food Chem.* 12(1); 1983; 33-43
Rice-shrimp mixture was allowed to undergo natural fermentation for 10 days at 31 C. Daily biochemical tests were carried out in fermented rice-shrimp mixture for 10 days. The protein fractions, particularly soluble-nitrogen, increased from the beginning until the end of the fermentation period. The same pattern also occurred with amino-nitrogen formation concomitant with the reduction in molecular weight of shrimp protein. Ammonia-nitrogen was produced in small amounts and reached a maximum on the seventh day. Cathepsin D activity in shrimp had an optimum pH of 3.5 and an optimum temperature of 40 C. The activity of this enzyme decreased with fermentation time. AA
- 69 AGUERRE (RJ), SUAREZ (C) and VIOLLAZ (PE). Moisture desorption isotherms of rough rice. *J. Food Technol.* 18(3); 1983; 345-51
Desorption isotherms of rough rice have been determined at 40,50,60 and 70 C and water activities (a_w) from 0.036 to 0.823. An attempt is made to describe the experimental equilibrium moisture content data using mathematical relationships available in the literature. A statistical analysis was performed to evaluate the goodness of fit of the different equations. From this analysis, it was concluded that Henderson's equation permits to correlate satisfactorily the experimental data for the whole range of water activity investigated. Finally, a simple empirical equation was postulated to take into account the effect of temperature on water sorption isotherms of rough rice grain. AA
- 70 KATO (H), OHTA (T), TSUGITA (T) and HOSAKA (Y). Effect of parboiling on texture and flavour components of cooked rice. *J. Agric. Food Chem.* 31(4); 1983; 818-23
Parboiling of *japonica* and *indica* rice affected the cooking properties of milled rice and resulted in a harder and less sticky texture of the cooked rice and reduced extractability of protein in the rice grain. During

the parboiling process, the unbound lipid and free fatty acid in milled rice decreased, whereas the lipid bound to starch and protein and free phenolic acid increased. The results of GC analyses of the headspace volatiles of cooked rice and the steam-distilled volatiles of milled rice revealed that, after parboiling, *trans*-2-alkenals, *trans*-2, *trans*-4-decadienal, phenylacetaldehyde, and 4-vinylphenol had increased whereas 1-alkanals had decreased. AA

- 71 BUTTERY (RG), LING (LC), JULIANO (BO) and TURNBAUGH (JG). Cooked rice aroma and 2-acetyl-1-pyrroline. *J. Agric. Food Chem.* 31(4); 1983; 823-6

The concentration of 2-acetyl-1-pyrroline has been determined in the steam volatile oils of 10 different varieties of rice. From these data the amount present in the cooked rice was calculated. This varied from less than 0.006 parts per million (ppm) for Calrose rice to 0.09 ppm for Malagkit Sungsong variety rice based on the dry weight of the rice. Odour panel evaluation described the odour of 2-acetyl-1-pyrroline as "popcorn" like. Odour evaluation of the amount of popcorn-like odour in the different rice varieties ranked them in the general order of the concentration of this compound. Other odour quality evaluation tests confirmed the importance of this compound to the aroma of the more aromatic rice varieties. AA

- 72 KUTHUBUTHEEN (AJ). Effect of pesticides on the seed-borne fungi and fungal succession on rice in Malaysia. *J. Stored Prod. Res.* 20(1); 1984: 31-9

Thiophanate methyl, thiram and 2-methoxyethyl mercury chloride (fungicide), carbaryl and malathion (insecticides) were tested on seed-borne fungi of rice. Storage of treated seeds for 6 months eliminated a large number of fungi originally present at harvest. The fungi which persisted on stored seeds, however, were those reported to be capable of causing grain deterioration and mycotoxin production. Fewer fungi were isolated from seeds treated with pesticides than with fungicides. JVS

TRITICALE

- 73 SINGH (JB), NIRANKAR NATH and SURJAN SINGH. Milling, baking and chapati making qualities of triticale. *J. Food Sci. Technol. (India)* 20(4); 1983; 141-4

Tempering of triticale to 14.5% moisture by cold and hot water (dipping in boiling water for 5 minutes gave a milling yield of 60.66 and 62.14% respectively compared to 57.7% obtained for the control, cold tempered flour. Triticale flour alone or on mixing with different levels of wheat flour (0,30,40,50,60 and 100% levels) was tested for rheological properties. Tempering improved the baking quality and the colour of the bread. As the cost of hot tempering is high, cold tempering was adequate. Bread prepared by blending 30% cold tempered triticale flour with 70% wheat flour was comparable in quality to whole wheat bread. Good chapaties could be obtained by blending 60% of untreated triticale flour with 40% wheat flour. KAR

WHEAT

- 74 RAHIM (A), VENKATESWARA RAO (G), VATSALA (CN) and SHURPALEKAR (SR). A novel approach for small-scale cleaning of wheat. *Indian Food Ind.* 2(1); 1983; 13-5

- 75 SYLTIE (PW) and DAHNKE (WC). Mineral and protein content, test weight, and yield variations of hard red spring wheat grain as influenced by fertilization and cultivar. *Qualitas plantarum*. 32(1); 1983; 37-49
- 76 ELIASSON (A-C).and KARLSSON (R). Gelatinization properties of different size classes of wheat starch granules measured with differential scanning calorimetry. *Starch*. 35(4); 1983; 130-33
- 77 SYLTIE (PW) and DAHNKE (WC). The vitamin B₁, B₂, B₆, B₁₂, and E contents of hard red spring wheat as influenced by fertilization and cultivar. *Qualitas Plantarum*. 32(1); 1983; 51-8
- 78 TRENHOLM (HL), COCHRANE (WP), COHEN (H), ELLIOT (JI), FRANWORTH (ER), FRIEND (DW), HAMILTON (RMG), STANDISH (JF) and THOMPSON (BK). Survey of vomitoxin contamination of 1980 Ontario white winter wheat crop. Results of survey and feeding trials. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 92-7
- 79 ANDEREGG (BN) and MADISEN (LJ). Effect of dockage on the degradation of (¹⁴C) malathion in stored wheat. *J. Agric. Food Chem.* 31(4); 1983; 700-704
- 80 PAIMAN (MH), CHAUHAN (R) and GUPTA (DS). Some non-toxic materials as wheat protectants against *Rhizopertha dominica*. *J. Food Sci. Technol. (India)* 20(4); 1983; 183-5
- Dusts or powders passing through 30 mesh seive of silica gel, Aluminium silicate, pyrophyllite, talc and neem seed kernel powder were used at 1-2% levels against 5 to 10 day old *R. dominica* in HD 2009 variety wheat. Silica gel pyrophyllite and talc provided 100% kill of the insects in wheat, exposed to these materials for a month. Silica gel proved the best and neem (*Azadaracta indica* L.) seed kernel powder least in preventing internal infestation of the grains. The loss observed in grains treated with silica gel was 13-15 times lower than in the control. The persistence of non-toxic materials was in the order of silica gel, aluminium silicate, neem seed kernel powder, talc and pyrophyllite. KAR
- 81 KEEVER (DW). Distribution patterns of lesser grain borer (Coleoptera: Bostrichidae) in towers of wheat, and effects of the presence of the granary weevil (Coleoptera: Curculionidae). *J. Econ. Entomol.* 76(3); 1983; 492-5
- Adult *Rhyzopertha dominica* (F.) and *Sitophilus granarius* (L.) were introduced into the tops of six towers (1.7-2.6 m high) filled with wheat. Samples removed two, three, and four months later revealed that <1.0% of *R. dominica* and *S. granarius* were found below 127 cm and 63 cm, respectively. Low population densities of *S. granarius* precluded determination of distribution patterns, but the damage caused by *S. granarius* apparently affected the distribution patterns of *R. dominica*. The distribution patterns of adult and immature *R. dominica* differed. AA
- 82 SEXENA (RP), SHAH (PC), SARKAR (BC) and SINGH (BPN). Performance evaluation of a community type wheat flour mill. *Indian Miller*. 14(5); 1983; 15-35
- Performance of a typical Burr mill (natural sand stone disc type) in grinding wheat under commercial conditions was studied. The mill concerned was one of common design used widely in North India. The study included

observations on mill capacity, power consumption, rise in flour temperature, ash content and granularity of flour. MVG

- 83 PREMAVALLI (KS) and ARYA (SS). Physical and chemical changes during roasting of semolina (suji). *J. Food Technol.* 18(4); 1983; 469-79

A simple laboratory method for uniform roasting of semolina under controlled conditions and for isolation of volatile compounds formed during roasting is described. The changes in sugars, proteins, lipids, gelatinization behaviour and carbonyl compounds formed during roasting of wheat semolina at 160, 175 and 190 C are discussed. AA

- 84 LEUNG (HK), MAGNUSON (JA) and BRUINSMA (BL). Water binding of wheat flour doughs and breads as studied by deuterium relaxation. *J. Food Sci.* 48(1); 1983; 95-9

Wheat flour doughs and breads were studied for water mobility by deuterium relaxation during pulsed NMR. Mixograms of dough and bread with water and deuterium oxide (D_2O) replacing water showed that wheat flour associated more strongly with D_2O than H_2O . Variation of $D_2O : H_2O$ ratio had no effect on longitudinal (T_1) or transverse (T_2) relaxation times of deuterium. Similar increases with water in T_1 and T_2 were seen in hard and soft flours. Staling of bread crumb decreased T_1 and T_2 pointing out decrease in water solubility and increase in water binding. The decrease in water mobility of the crumb with time of storage was independent of moisture reduction. MVG

- 85 KUMAR (GV), HARIDAS RAO (P), RANGA RAO (CGP) and SHURPALEKAR (SR). Processing, nutritive value and utilization of wheat germ: A byproduct of flour milling industry. *Indian Miller.* 13(4); 1983; 17-35

Wheat germ collected from different flour mills varied widely in all chemical constituents which was attributed to differences in purity of the samples as well as the type and quality of wheat used. Free sugar content was high (10.5 - 16.8%), and the oil of the germ was 10% and contains 33 mg vitamin E/100 g. Dry heat treatment (toasting) and moist heat treatment (steaming and drum drying and defatting) were also studied for their effects on acceptability and nutritional value. Heat treatments stabilised the germ, improved the nutritive value and increased the shelflife from one week to > 24 week. Toasting and steaming were found to be effective and at the same time feasible as they do not need elaborate equipment and processing methods. Drum drying process, besides stabilising the germ, gave a highly acceptable ready-to-eat product. The utilisation of wheat germ in various flour-based products is also indicated. MVG

OAT

- 86 THRO (AM), FREY (KJ) and HAMMOND (EG). Inheritance of fatty acid composition in oat (*Avena sativa* L.) caryopses. *Qualitas Plantarum.* 32(1); 1983; 29-36

- 87 EGGUM (BO) and GULLORD (M). The nutritional quality of some oat varieties cultivated in Norway. *Qualitas Plantarum.* 32(1); 1983; 67-73

The chemical composition, yield values, and protein quality were measured in 12 oat varieties cultivated in Norway. The protein quality was based on amino acid composition and true protein digestibility, biological

value, net protein utilization, and utilizable protein obtained in N-balance experiments with rats. The protein concentration in dry matter varied from 10.25% to 15.69%, while fat varied from 5.70% to 10.41%. The variation in readily soluble carbohydrates, crude fibre, ash, and tannin was relatively low. Dry matter yield per hectare varied from 1675 to 6222 kg. The yield of protein, fat, and essential amino acids was also highest in the variety with the highest yield. True protein digestibility was above 90% in all varieties while the biological value was in the range of 74.5%-79.6%. In contrast, to most other cereal grains, protein quality was not affected by protein concentration. This resulted in utilizable protein above 10% for several of the oat varieties. AA

MILLETS

PEARL MILLET

- 88 SANKARA RAO (DS) and DEOSTHALE (YG). Mineral composition, ionisable iron and soluble zinc in malted grains of pearl millet and ragi. *Food Chem.* 11(3); 1983; 217-23

Grain samples of nine varieties of pearl millet (*P. typhoides*) and six varieties of ragi (*E. coracona*) were analysed before and after malting for total ash, phosphorus, phytin phosphorus, calcium, magnesium, iron, zinc, manganese, copper and chromium contents. In pearl millet, varietal differences were significant for iron, manganese and chromium contents. Significant nutrient losses in malting were, in pearl millet: iron and manganese, 40%; copper, 30%, and phosphorus, 25% and, in ragi: calcium 40%; zinc, 30% and copper 25%. As judged by an *in vitro* method, the availability of iron and zinc in millets improved several fold on malting. The values for ionizable iron (mg per 100 g of raw and malted grains) were 0.64 and 2.70 in pearl millet and 0.29 and 2.98 in ragi. Soluble zinc contents per 100 g of raw and malted grains, respectively were 2.04 and 5.25 mg in pearl millet and 2.15 and 3.24 mg in ragi. Reduction in phytin phosphorus on malting of these millets partly explained the improved availability of iron and zinc. AA

- 89 CHANDRASEKHAR (G) and PATTABIRAMAN (TN). Natural plant enzyme inhibitors: Purification and properties of an α -amylase inhibitor from bajra (*Pennisetum typhoideum*). *Indian J. Biochem. Biophys.* 20(4); 1983; 241-5

Bajra seeds were extracted with 0.1 N HCl followed by ammonium sulphate fractionation and affinity chromatography using amylase - Affinity matrix to isolate an α -amylase inhibitor. The preparation was found active against human salivary, human pancreatic, hog pancreatic and bovine pancreatic amylase with its highest activity being on human salivary amylase. Pepsin, pronase and α -chymotrypsin, and heat treatment at 80 C inactivated the inhibitor. It was fairly stable in acidic pH but gradually lost activity in alkaline pH range. Inhibitory activity was also lost by chemical modification of amino and guanidino groups. Formation of enzyme - inhibitor was demonstrated by gel chromatography and the mode of inhibition was found to be non-competitive. The inhibitory activity was lost gradually during germination of seeds. MVG

SORGHUM

- 90 ALI (MR) and WILLS (RBH). Milling and cooking of hybrid sorghum grain. *Qualitas plantarum*. 32(1); 1983; 59-66
- Fourteen commercial hybrid cultivars of sorghum grain were examined for physical characteristics before and after being milled. abrasion. Milling to 10% total loss in weight resulted in the pigments in the pericarp being effectively removed but colour spots on the hilar and germ remained on most cultivars and the testa was exposed on some cultivars. Milling showed that the cultivars were of varying degrees of hardness but all gave >80% yield of unbroken kernels with the germ attached. The milled grains were boiled like rice but the cooking time was high for all cultivars (range 57-64 minutes) although the water uptake and swelling of the cooked grain was satisfactory and the solids lost during cooking was low. AA
- 91 TAYLOR (JRN). Effect of malting on the protein and free amino nitrogen composition of sorghum. *J. Sci. Food Agric.* 34(8); 1983; 885-92

MAIZE

- 92 ROUSHDI (M), HARRAS (A), EL-MELIGI (A) and BASSIM (M), EL-SHEIKH (K). Effect of high doses of gamma rays on corn grains. Part II. Influence on some physical and chemical properties of starch and its fractions. *Starch*. 35(1); 1983; 15-8
- An increase in solubility, alkali number and ferricyanide number and decrease in relative viscosity were found in starch isolated from irradiated ir-dried as well as moist corn grains as the dose level was raised. The swelling power increased up to 2 megarad, then decreased rapidly, Infrared analysis revealed an additional absorption band which arises from a new methylene group at 5 megarad. An increase in amylose percentage concomitant with a decrease in amylopectin percentage was found as the radiation dose was increased up to 2 megarad. Above 2 megarad, the opposite was found. The chain length of amylose and amylopectin showed a progressive decrease as the irradiation dosage was raised. AA
- 93 ECKHOFF (SR) and OKOS (MR). A direct titrimetric method for the rapid estimation of water-extractable sulphur dioxide in corn grain. *J. Agric. Food chem.* 31(4); 1983; 826-9
- The method differs from standard alkali or distillation procedures in that bound SO₂ is not measured. Sulphur dioxide in ground corn samples is extracted in a buffer solution and titrated with iodine directly, without filtration. Average standard deviation of the method was 21.3 ppm, as determined from samples containing SO₂ levels ranging from 162.3 to 1197.0 ppm (weight basis). The method requires no specialized equipment and is suitable for control or research purposes. Direct comparison was made with the distillation procedure of the Manufacturing Confectioners; Alliance and the FMF (Pearson, 1977). AA
- 94 SHOTWELL (OL), BENNETT (GA), KWOLECK (WF) and HESSELTINE (CW). Treatment of freshly harvested 1980 Georgia dent corn samples collected for aflatoxin analysis. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 204-7
- 95 DRAUGHON (FA), ELAHI (ME) and WEST (DR). Insecticide inhibition of aflatoxin production in corn. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 204-7

in culture medium and in field corn was investigated. Bux, carbofuran, carbaryl, fonofos, fensulphothion, EPN, heptachlor, and toxaphene were added to culture medium at levels of 0, 10, 50, and 100 ppm. Bux, naled, carbaryl, and fonofos at 100 ppm inhibited aflatoxin production by 97, 100, 55, and 64%, respectively. Bux, naled, and carbaryl were applied to *Aspergillus parasiticus* inoculated corn in the field at levels of 100 ppm biweekly. Corn inoculated but not treated with insecticide had a mean aflatoxin concentration of 126 ppb. Bux and carbaryl reduced aflatoxin in inoculated corn to 47 and 49 ppb, respectively. In uninoculated corn, carbaryl and Bux reduced aflatoxin from 27 ppb to less than 5 ppb. Application of naled to corn did not effectively reduce aflatoxin production. AA

PULSES

96. CHAVAN (JK), JAWALE (HK), SHERE (DM) and KADAM (SS). Effect of pre-soak treatment on the cooking quality of legume dhals. *Indian Food Packer*. 37(2); 1983; 78-81
Splits or dhals of (i) pigeon pea (*Cajanus cajan*), (ii), chick pea (*Cicer arietinum*), (iii) mung bean, (*Phaseolus aureus*), (iv) black bean (*Phaseolus mungo*) and (v) lentil (*Lens esculentum*) were soaked in (a) soak-solutions (b) 1.5% NaHCO_3 , (c) 0.5 Na_2CO_3 and 0.75% citric) or in distilled water at 25 C for 1-6 hours (1:3 w/v) and assessed for their cooking quality. (a), (b), and (c) were found more effective in reducing cooking time significantly than soaking in water. For maximum reduction in cooking time, optimum soaking time for (i), (ii) and (iii) were 6 hours, 5 hours, 3 hours respectively while for (iv) and (v), it was 2 hours. BSN
97. SASTRY (SK) and KILARA (A). Temperature response of frozen peas to di-thermal storage regimes. *J. Food Sci.* 48(1); 1983; 77-83
A mathematical model has been developed to predict temperature fluctuations in warehouse stacks of frozen peas subjected to di-thermal storage regimes. It could be used to evaluate quality changes due to di-thermal storage and the requirement of energy to maintain target-quality. MVG
98. HAFEZ (YS) and MOHAMED (AI). Presence of nonprotein trypsin inhibitor in soy and winged beans. *J. Food Sci.* 48(1); 1983; 75-6
The total trypsin inhibitor was precipitated from extracts of soybean and winged bean by using 16% trichloroacetic acid (w/v). The nonprotein trypsin inhibitor activities were determined in protein-free supernatants and they varied between 10.32 ± 1.39 and 24.41 ± 1.04 units/mg defatted soyabean samples and 2.65 ± 0.62 and 6.79 ± 0.27 units/mg defatted winged bean samples. The inhibitor was composed of 27-55% of the total trypsin inhibitor activity in the soyabean and 5-14% in winged beans. MVG
99. GAYDOU (EM), BIANCHINI (J-P) and RATOVOHERY (JV). Triterpene alcohols, methyl sterols, sterols, and fatty acids in five Malagasy legume seed oils. *J. Agric. Food Chem.* 31(4); 1983; 833-6

BLACK GRAM

- 100 SATHE (SK), DESHPANDE (SS) and SALUNKHE (DK). Functional properties of black gram (*Phaseolus mungo* L.) proteins. *Food Sci. + Technol.* 16(2); 1983; 69-72

A protein concentrate (69.84% protein on dry weight basis) prepared from black gram flour had minimum solubility at pH 4.0. Its other properties were: water absorption capacity 5.9 g/g; oil absorption capacity 3.4 g/g; least gelation concentration 9% (w/v); foaming capacity 66% (for 1% slurry); emulsifying activity (98.6%); and emulsion stability of the protein, 93.1%. Alkali solubilization of black gram proteins resulted in significant reduction in phytic acid, trypsin, and chymotrypsin inhibitory activities, and improved the *in vitro* protein digestibility. KMD

CHICK PEA

- 101 EL FAKI (HA), DESIKACHAR (HSR), PARAMAHANS (SV) and THARANATHAN (RN). Physico-chemical characteristics of starches from chick pea, cow pea, and horse gram. *Starch.* 35(4); 1983; 118-22

COW PEA

- 102 MESSINA (FJ) and RENWICK (JAA). Effectiveness of oils in protecting stored cowpeas from the cowpea weevil (Coleoptera: Bruchidae). *J. Econ. Entomol.* 76(3); 1983; 634-6

Applications of five chemically differing oils (three vegetable oils, mineral oil, and polyethylene glycol) at dosages of 5.0 ml of oil per kg of seed effectively protected cowpeas, *Vigna unguiculata*, from *Callosobruchus maculatus* (F.). Oils caused high mortality of eggs and larvae on the seed surface, but had no effect on individuals that successfully entered the seed. A lack of oil-specific activity indicated that the protective property was physical rather than chemical. After 30 days in storage, treated seeds were more deterrent to ovipositing females than were newly treated seeds, but the stored seeds were less toxic to eggs and larvae. Oil application may therefore, be useful for only a limited period of time. AA

FABABEAN

- 103 ESKIN (NAM) and WIEBE (S). Changes in phytase activity and phytate during germination of two fababean cultivars. *J. Food Sci.* 48(1); 1983; 270-71
- 104 SIMONE (FDC), MORRICA (P), RAMUNDO (E), SENATORE (F) and TACCONE (W). Free amino acids from different cultivars of *Vicia faba*. *J. Agric. Food Chem.* 31(4); 1983; 836-8
- 105 MARQUARDT (RR), MUDUULI (DS) and FRÖHLICH (AA). Purification and some properties of vicine and convicine isolated from fababean (*Vicia faba* L.) protein concentrate. *J. Agric. Food Chem.* 31(4); 1983; 839-44

GREEN GRAM

- 106 KRISHNAMURTHY (KS) and VENKATARAMAN (LV). Physico-chemical characterization of green gram (*Phaseolus aureus*) proteins during germination. *Indian Food Packer*. 37(2); 1983; 58-62

Changes in the reserve proteins of green gram (*Phaseolus aureus*) during germination were monitored by the standard physico-chemical techniques. On gel filtration, the total proteins are resolved to give distinct fractions. The S_{20} , W values were 5.9 and 8.8, of which 5.9 S fraction is a major component. There is degradation of higher molecular weight storage proteins to lower molecular weight fractions as a result of germination. The degradation is more pronounced at 72 hours of germination. BSN

LOCUST BEAN

- 107 ODUNFA (SA). Carbohydrate changes in fermenting locust bean (*Parkia filicoidea*) during *iru* preparation. *Qualitas Plantarum*. 32(1); 1983; 3-10

Oligosaccharides were the most abundant carbohydrates in the unfermented African locust beans. Flatus-forming oligosaccharides stachyose, raffinose and sucrose - were the main constituents. During the first 24 hours of fermentation, the quantities of the oligosaccharides decreased significantly. The reducing sugars increased during the first 12 hours of fermentation but then decreased. The reducing sugars detected in the unfermented and fermented locust beans were similar; these were galactose, glucose and fructose. The activities of galactosidase were highest at 24 hours from the start of fermentation while the peak of sucrose activity was at 36 hours. AA

PINDAK BEAN

- 108 DREHER (ML), PADMANABAN (G) and FRAZIER (RA). Characteristics of pindak bean starch. *J. Agric. Food Chem.* 31(4); 1983; 844-6

WINGED BEAN

- 109 TAN (N-H), RAHIM (ZHA), KHOR (H-T) and WONG (K-C). Winged bean (*Psophocarpus tetragonolobus*) tannin level, phytate content and hemmagglutinating activity. *J. Agric. Food Chem.* 31(4); 1983; 916-7

Sixteen varieties of winged bean (*Psophocarpus tetragonolobus*) were assayed for tannin level, phytate content, and hemagglutinating activity. Tannin level ranged from 0.3 to 7.5 mg of D-catechin/g of bean, phytate content ranged from 6.10 to 7.52 mg of phosphorus/g of bean, and the hemagglutinating activities of the surveyed beans ranged from 40 to 320 hemagglutinating units/mg of bean. It is found that none of the winged bean varieties surveyed contains amounts of tannin or phytate that may be nutritionally harmful. The winged bean hemagglutinating activity is stable to dry heat treatment (100 C, 2 hours), but could be destroyed completely by 5 minutes autoclave treatment at 120 C, 1.05 kg/cm². AA

OILSEEDS AND NUTS

- 110 RANJANA GUPTA, RAUF (A), AHMAD (MS), AHMAD (F) and OSMAN (SM). Chemical screening of seed oils. *J. Oil Technol. Assoc. (India)* 15(1); 1983; 6-7
- Seed oils from six Indian species, belonging to different, and less familiar, botanical families have been studied for oil, protein, and fatty acid composition. The oils from three species - *Canavalia gladiata*, *Passiflora edulis* or passion fruit, and *Zanthoxylum rhetsa* - were found to be rich in the conventional unsaturated acids, and merit attention for utilization as minor seed oils. The other three species *Linum mysorensis*, *Bixa orellana*, and *Terminalia catappa* - were rich in saturated fatty acids (52.4-74.6%). KMD
- 111 JACKS (TJ), HENSARLING (TP) and MULLER (LC). Increased oilseed protein solubility after peroxide exposure. *J. Am. Oil Chem. Soc.* 60(4); 1983; 852-3
- Oilseed proteins of peanut (arachin), pumpkin (cucurbitin) and soy (11-S glycinin) were exposed to 30% H₂O₂. Solubilities of arachin, cucurbitin, and glycinin increased 8.5-fold, 40-fold, and ca. 200-fold respectively, in aqueous (arachin and cucurbitin) or acidic (glycinin) media. Implications for utilization of oilseed proteins following exposure to H₂O₂ are discussed. AA

COTTONSEED

- 112 PRASADA RAO (R), SURENDRANATH (MR), AZEEMODDIN (G), ATCHYUATA RAMAYYA (D) and THIRUMALA RAO (SD). Pilot plant processing of Indian cottonseed J.S. 34 seed. *J. Oil Technol. Assoc. (India)* 15(1); 1983; 10-11
- Processing characteristics of the JS 34 variety of cottonseed have been studied in the pilot plant. The seed contains 6.9% residual lint, 18.7% oil, and 19.6% protein. On crushing, an oil yield of 11.5% was obtained. KMD
- 113 REBER (EF), KUO (M-F) and SADEGHIAN (SB). Protein quality of processed whole kernel glandless cottonseed. *J. Food Quality*. 6(1); 1983; 65-71
- Protein quality of raw, cooked and roasted glandless whole kernel cottonseed flour was determined. The adjusted protein efficiency ratio (PER) of cooked (2.10) cottonseed was significantly ($P=0.01$) higher than roasted (1.77) cottonseed. Protein retention efficiency (PRE) for roasted cottonseed (58.08) was lower than values for raw (60.54) and cooked (62.95) cottonseed. Relative protein values (RPV) indicated a utilization of 91, 91 and 96% of the protein in raw, roasted and cooked cottonseed, respectively. Cooked glandless cottonseed protein quality was superior to that of raw cottonseed. The roasting process adversely affected protein quality. Supplementation of roasted cottonseed with 0, 0.2, 0.4, 0.6 and 0.8% L-lysine indicated a peak PER response at 0.45%. The adverse effect of roasting on the protein quality of cottonseed was overcome by addition of L-lysine which made the protein quality of roasted cottonseed comparable to that of cooked cottonseed. AA
- 114 OJOFEITIMI (EO). Comparative protein nutritional value of degossypolized cottonseed - yam flour and defatted soyabean - yam flour mixtures. *Food Chem.* 12(1); 1983; 25-32

The main PER values for casein-corn starch, casein-yam flour, cottonseed - yam flour, and soyabean - yam flour diets were 3.1, 2.8, 2.2 and 1.8 respectively at 10% protein level used 20% yam incorporation. It is concluded that the protein quality of yam flour could be augmented by supplementing it with either cottonseed or soyabean flour. KAR

- 115 DELUCCA (AJ) II, EHRLICH (KC) and CIEGLER (A). Toxicity of extracts of *Aspergillus niger* isolated from stored cottonseed. *J. Food Safety*. 5(2); 1983; 95-101

GROUNDNUT

- 116 FARAH (Z), MARTINS (MJR) and BACHMANN (MR). Removal of aflatoxin in raw unshelled peanuts by a traditional salt boiling process practised in the North East of Brazil. *Food Sci. + Technol.* 16(2); 1983; 122-4

Salt boiled unshelled peanut samples, commercialized and processed traditionally in the city of Recife (Brazil) were assayed for aflatoxins in order to examine the effect of sodium chloride in removing aflatoxins. No aflatoxin could be detected in the salt-boiled peanuts in contrast to the raw peanut samples which were all contaminated. The efficiency of sodium chloride in removing aflatoxins was confirmed by cooking laboratory - inoculated batches of raw, unshelled peanuts in a 5% aqueous sodium chloride solution at 116 C for 30 minutes. Results of five batches containing aflatoxin ranging from 19.992 ppb to 6,6320 ppb showed a removal of aflatoxins from 80% to a non-detectable level. Based on the findings of this investigation, it appears possible to remove or reduce aflatoxin in peanuts by boiling them in a sodium chloride aqueous solution. AA

LINSEED

- 117 MADHUSUDHAN (KT) and NARENDRA SINGH. Studies on linseed proteins. *J. Agric. Food Chem.* 31(5); 1983; 959-63

A simple method of dehulling and demucilaging of linseed was developed. Solubility of the proteins of the linseed meal in water, 0.5 and 1.0 M NaCl, and 2% sodium hexametaphosphate solutions was determined in the pH range 2-12. The solubility was minimum around pH 3-6 and maximum around pH 8.0. The solubility minimum shifted to pH 0.5-4.5 in 1 M NaCl and to 0.6-5.3 in 2% sodium hexametaphosphate. The total proteins were characterized by techniques of gel filtration, ion-exchange chromatography, electrophoresis, and ultracentrifugation. The presence of atleast three components was observed. The meal extracts showed proteolytic and trypsin inhibitor activities; but no hemagglutinating activity. Amylase and amylase inhibitor activities were not detected. AA

SOYABEAN

- 118 CHOW (ETS), WEI (LS), DEVOR (RE) and STEINBERG (MP). Application of two-level fractional factorial designs in development of a soyabean whipped topping. *J. Food Sci.* 48(1); 1983; 230-34

- 119 HUTCHINSON (D) and OTTEN (L). Thin-layer air drying of soyabeans and white beans. *J. Food Technol.* 18(4); 1983; 507-22
A thin-layer air drying apparatus was designed and constructed to determine the drying characteristics of various agricultural and food products. The equipment was designed to monitor the weight loss during drying and to operate over a practical range of air temperatures and humidities. This paper presents a description of the apparatus and an evaluation of its performance. The results of studies conducted to determine the thin-layer drying behaviour of soyabeans and white beans are included. AA
- 120 ZADERNOWSKI (R) and KOZLOWSKA (H). Phenolic acids in soyabean and rapeseed flours. *Food Sci. + Technol.* 16(2); 1983; 110-14
Samples of rapeseed and soyabean flour were first extracted with methanol. Thereafter, free and bound fat in the sample was removed by means of trichloroethylene. The phenolic acids so obtained were purified and the fatty acids removed. It was found that rapeseed flour contained almost 9 times as much of phenolic acids as soyabean flour. KMD
- 121 GAYDOU (EM) and ARRIVETS (J). Effects of phosphorus, potassium, dolomite, and nitrogen fertilization on the quality of soyabean. Yields, proteins, and lipids. *J. Agric. Food Chem.* 31(4); 1983; 765-9
- 122 GOULDING (NJ), GIBNEY (MJ), GALLAGHER (PJ), MORGAN (JB), JONES (DB) and TAYLOR (TG). The immunological consequences of a high intake of soyabean protein in man. *Qualitas Plantarum.* 32(1); 1983; 19-27
Fifty-three volunteers undertook to consume at least four meals per week based on soyabean textured vegetable protein (TVP) for 42 days. Changes in dietary habits were assessed and there were no changes in the distribution of energy between fat, carbohydrate, and protein. Plasma total and high-density lipoprotein cholesterol and plasma triglycerides were significantly increased during the experiment ($P < 0.001$). There were no significant changes in soya-specific antibodies (immunoglobulins G, A or M) or in total serum immune complexes in the group as a whole. There was no relationship between the intakes of either milk protein or soyabean protein and their corresponding antibodies, irrespective of immunoglobulin class. It is concluded that for most human subjects, there are no apparent immunological consequences of consuming a high intake of soyabean protein. However, the plasma of a minority of the volunteers showed a marked increase in soy antibodies of some or all classes. AA
- 123 PALLAVICINI (C), PERUFFO (ADB) and FINLEY (JW). Comparative study of soyabean plasteins synthesized with soluble and immobilized α -chymotrypsin. *J. Agric. Food Chem.* 31(4); 1983; 846-8
- 124 LEI (M-G), TYRELL (D), BASSETTE (R) and REECK (GR). Two dimensional electrophoretic analysis of soyabean proteins. *J. Agric. Food Chem.* 31(5); 1983; 963-8
- 125 WEINGARTNER (KE), NELSON (AJ) and ERDMAN (JW) Jr. Effects of calcium addition on stability and sensory properties of soy beverages. *J. Food Sci.* 48(1); 1983; 256-7, 263
Pasteurized or thermally processed soy beverages (6% soy solids) were fortified to a comparable level of cow's milk with 25 mM (or 30 mM) calcium using mixtures of calcium citrate and tricalcium phosphate. These fortified

pasteurized products had acceptable sensory properties. Addition of these calcium salts did not adversely affect protein stability of the beverage. Calcium citrate addition caused a decrease in beverage pH and viscosity. Thermally processed (still retort and agitort) canned beverages containing calcium salts were stable for 6 months when stored at 1 C or at room temperature. AA

- 126 PATIL (GR) and GUPTA (SK). Cost of soy-whey beverage: A case study. *Indian Food Packer*. 37(2); 1983; 84-90

The component-wise cost of production of fresh soy-whey beverage (SWB), soy-whey beverage powder (SWBP) and the reconstituted beverage obtained from powder was estimated. The fresh SWB was estimated to cost Rs.1.68 per litre which included the raw material cost of Rs. 1.30 and processing cost of Re. 0.38. The SWBP was found to cost Rs.10.20/kg with raw material cost of Rs.7.00 and processing cost of Rs.3.20, whereas the reconstituted beverage (18.5% T.S.) was found to cost Rs. 1.93 per litre including Rs.1.32 for raw materials cost and Re.0.61 for processing cost. AA

- 127 DEL VALLE (FR), PICO (ML), CAMACHO (JL) and BOURGES (H). Effect of processing parameters on trypsin inhibitor and lectin contents of tortillas from whole raw corn-soyabean mixtures. *J. Food Sci.* 48(1); 1983; 246-49, 252

SUNFLOWER

- 128 KABIRULLAH (M) and WILLS (RBH). Characterization of sunflower protein. *J. Agric. Food Chem.* 31(5); 1983; 953-6

Sunflower protein isolates were prepared based on their solubility in alkali, water, and sodium chloride. The protein isolates were analyzed for proximate composition and amino acid content, and their solubility was determined over the pH range 1-11. The proteins were fractionated and characterized by gel filtration chromatography, ultracentrifugation, and gel electrophoresis and found to contain six to seven protein fractions with molecular weights ranging from 450×10^3 to 10×10^3 . The major fraction had a molecular weight of 125×10^3 , and the average molecular weight was calculated to be 180×10^3 . AA

- 129 DREHER (ML) and HOLM (ET). A high performance liquid chromatographic method for chlorogenic acid determination in sunflower seeds. *J. Food Sci.* 48(1); 1983; 264-5

A new high performance liquid chromatographic (HPLC) method for chlorogenic acid determination in sunflower seeds is described. This method offers a relatively rapid and highly selective way to separate chlorogenic acid from caffeic acid and other polyphenolic compounds in sunflower seeds. The HPLC method results are compared with those of the spectrophotometric method and no significant difference is shown between methods using confectionery seeds but significant differences are shown with the oilseed varieties. AA

COCONUT

- 130 SAIITAGAROON (S), KAMAKISHI (S) and NAMIKI (M). Characterisation of polysaccharides of copra meal. *J. Sci. Food Agric.* 34(8); 1983; 855-60

Sugar composition analyses of the extraction products examined by GLC indicate that mannan is the major polysaccharide in copra meal and accounts for about 61% of the total polysaccharide in deproteinised holocellulose. Other polysaccharides present in copra meal are, in descending order, cellulose, arabinoxylogalactan, galactomannan, arabinomannogalactan and galactoglucomannan. KAR

TUBERS AND VEGETABLES

ONION

- 131 AKSOY (HA). An investigation of the ethereal oils of onion (*Allium cepa* Liliaceae) of Turkish origin. *Z Lebensmittel-Unters Forsch* 177(1); 1983; 34-6 (German)

The essential oils of Turkish onions obtained by steam distillation and analyzed by gas chromatography contained predominantly disulphides. Comparisons were made between oil content and disulphide composition of various species and also between freshly chopped and stored onions. AA

BEET

- 132 IVERSON (C) and SCHWARTZBERG (HG). Developments in beet and cane sugar extraction. *Food Technol.* 38(1); 1984; 40-44

Development of continuous extractors for sugar beet and cane sugar, types of extractors (countercurrent screw conveyer extractors - tower extractors, scope extractors; counter current drag chain extractors; multi-stage cross flow extractors; trommel extractors; multistage scroll extractors) diffusion batteries; design and operating consideration; and trends, towards larger hints. Drawings of extractors have been provided. JVS

TURNIP

- 133 TRUSCOTT (RJW), JOHNSTONE (PK), MINCHINTON (IR) and SANG (JP). Indole glucosinolates in Swede (*Brassica napobrassica* L. Mill). *J. Agric. Food Chem.* 31(4); 1983; 863-7

CARROT

- 134 SELMAN (JD), RICE (P) and ABDUL-REZZAK (RK). A study of the apparent diffusion coefficients for solute losses from carrot tissue during blanching in water. *J. Food Technol.* 18(4); 1983; 427-40

The apparent diffusion coefficients (D_a) for total solute loss from cylinders of Chantenay carrot cortex tissue were calculated after blanching under various conditions. Cell sap concentration was measured before and after blanching for times up to 1800 seconds, in the temperature range 333-363 K. Values of D_a were found to be in the range 3×10^{-10} - 8×10^{-10} m²/sec. and could be related to temperature by an Arrhenius type equation, having an activation energy of 28.2 kJ/mol. D_a was independent of cylinder diameter between 0.005 and 0.007 m, but appeared to increase in blanch media

concentrations that were higher than the initial carrot cell sap concentration. The formal numerical solutions for unsteady state diffusion mass transfer were recalculated in the relevant cell sap concentration range (7.8-10.4% as sucrose), and are given in tabular form for the shapes of slab of infinite extent, sphere, and cylinder of infinite length. In design, these results will allow the prediction of mean cell sap concentration, and hence the overall losses incurred, after a given blanch or wash treatment in this time and temperature range. AA

- 135 McLELLAN (MR), CASH (JN) and GRAY (JI). Characterization of the aroma of raw carrots (*Daucus carota* L.) with the use of factor analysis. *J. Food Sci.* 48(1); 1983; 71-2, 74

Five independent aroma attributes are defined. These attributes are not key components of raw carrot aroma but help characterise inter-varietal variations based on nasally detected aroma. MVG

- 136 SCHADLE (ER), BURNS (EE) and TALLEY (LJ). Forced air drying of partially freeze-dried compressed carrot bars. *J. Food Sci.* 48(1); 1983; 193-6

The quality of compressed carrot bars produced by combining freeze drying with air drying was investigated. Quality parameters measured were colour, texture, rehydration ratio, carotene, ascorbic acid, alphanatocopherol, and sensory acceptance. It was found that a high quality compressed carrot bar could be obtained by freeze drying to 10-40% moisture, equilibrating with microwave energy, compressing and then air drying at 60 C. The scanning electron microscope proved useful in delineating reasons for differences in texture and rehydration. AA

POTATO

- 137 VAZQUEZ (A) and CALVELO (A). Gas-particle heat transfer coefficient for the fluidization of different shaped foods. *J. Food Sci.* 48(1); 1983; 114-8

- 138 RICHTER (Von G) and GROSSER (D). Enzymatic processes in the processing of potatoes. *Starch.* 35(4); 1983; 113-8 (German)

Many enzymatic processes are now available for the conversion of various potato constituents, like starch protein, fibre, and pectin. Special mention is made of the amylases used for liquefaction and saccharification of pure potato starch, direct enzymatic saccharification of potatoes, and in the potato distillery. The use of bacterial α -amylase is also recommended for the production of a dietetically effective potato juice, and for the conversion of wastes resulting from manufacture of convenience foods like chips and French-fried potatoes. The processed waste may be used for feeding pigs, or for manufacture of potable or power alcohol. Some results treatment of potato pulp - waste material from potato starch manufacture with pectinases, cellulases, and amylases have been reported; modification of potato protein has also been described. KMD

- 139 BUSHWAY (RJ), BUREAU (JL) and McGANN (DF). Alpha chaconine and alpha-solanine content of potato peels and potato peel products. *J. Food Sci.* 48(1); 1983; 84-6

HPLC was used for the analysis of α -chaconine and α -solanine contents in raw and cooked potato peels. The values for raw peels were 1.30-56.67 mg/100 g of α -chaconine and 0.5-50.16 mg/100 g of α -solanine both on wet weight.

basis. Raw flesh contained 0.02-232 mg/100 g of α -chaconine and 0.01-2.18 mg/100 g of α -solanine both on wet weight basis. The dried and baked-fried peels contained more α -chaconine (2.18-92.82 mg/100g) and α -solanine (1.09-72.09 mg/100g). The commercial peel products (wedges, slices- dried peels and baked-fried) contains 3.60-13.71 mg/100 g of α -chaconine and 1.60-10.48 mg/100 g of α -solanine. It was concluded that to avoid glycoalkaloids toxicity, varieties with low glycoalkaloid concentration might be used. It was also shown that after peeling 3-3.5 mm from potatoes, the remainder contained very little glycoalkaloid. Thus, varieties with good processing quality could also be used though they might have high glycoalkaloid level. MVG

- 140 CALIFANO (AN) and CALVELO (A). Heat and mass transfer during the warm water blanching of potatoes. *J. Food Sci.* 48(1); 1983; 220-25
- 141 MAINI (SB), BRIJESH DIWAN and ANAND (JC). Removal of solanine from sprouted potatoes. *Indian Food Packer.* 37(2); 1983; 82-3
Solanine content in chips and shreds prepared from sprouted potatoes was reduced upto 84% by leaching with 0.3% acetic acid for 2 hours followed by blanching for 5 minutes. Solanine was not detected in the extracted starch from sprouted potatoes. BSN
- 142 SULLIVAN (JF), KONSTANCE (RP), EGOVILLE (MJ) and CRAIG (JC). Storage stability of continuous explosion-puffed potatoes. *Food Sci. + Technol* 16(2); 1983; 76-80
The shelf-life of potato dice prepared by the continuous explosion puffing system (CEPS) was found to be 6 months at 24 C and 4 months at 38 C. The potatoes were protected by anti-oxidants containing 50 ppm BHA, or 25 ppm BHA + 25 ppm BHT. Acceptance tests indicated that even 12-month-old samples were acceptable, because the off-flavours could be masked by a bland cream sauce. Colour changed but little during the test, and a maximum of 30% BHA and 34% SO₂ was lost. KMD
- 143 GHANEKAR (AS), PADWAL-DESAI (SR) and NADKARNI (GB). Irradiation of potatoes: Influence on wound periderm formation and on resistance to soft rot. *J. Agric. Food Chem.* 31(5); 1983; 1009-13
The susceptibility of the irradiated (10, 25, and 50 krad) potatoes to soft rot was assessed by a quantal response test. Though there was no apparent increase in susceptibility to soft rot at 10 krad, higher doses rendered the tubers more susceptible, concomitant with the doses employed. The irradiated tubers formed physically weaker periderm, and lower levels of resistance compounds were observed such as phenolics and phytoalexins as compared to unirradiated potatoes. The composition of free lipids of wound periderm and the aliphatic fraction of suberin was not, however, affected by the irradiation treatment. Tubers irradiated at a sprout inhibiting dose (10 krd) did not exhibit enhanced susceptibility to soft rot at temperatures below 20 C. AA
- 144 FAULKS (RM) and GRIFFITHS (NM). Influence of variety, site, and storage on physical, sensory and compositional aspects of masked potato. *J. Sci. Food Agric.* 34(9); 1983; 979-86
The work carried out with 3 principal UK main crop varieties, site influenced dry matter and hence physical and sensory texture more strongly than variety. KAR

- 145 ARTZ (WE), PETTIBONE (CA), AUGUSTIN (J) and SWANSON (BG). Vitamin C retention of potato fries blanched in water. *J. Food Sci.* 48(1); 1983; 272-3
 Vitamin C retention was determined microfluorometrically for French fries heated in water. Vitamin C retention for 1.3 cm ($\frac{1}{2}$ in.) water blanched French fries ranged from 83.2-54.1%. The French fry blanch times were 5, 10 and 15 minutes at 66 C, 77 C and 88 C. The apparent E_a was 4.0 Kcal/mole. AA

- 146 PRAZNIK (W), SMIDT (S) and EBERMANN (R). Gel-chromatographic investigation on hydrolytically degraded amyloses. *Starch.* 35(12); 1983; 58-61 (German)
 When potato amylose was degraded with mineral acids, there was an exponential decline simultaneously in the components having high and low molecular weights. But when β -amylase was used to degrade potato amylose, a wide distribution of degradation products was obtained. High-molecular-weight components were degraded much more slowly than those of average or low molecular weight. Therefore, it is very likely that the degradation of amylose by β -amylase follows a multi-chain-action mechanism. KMD

SWEET POTATO

- 147 WAGNER (AB), BURNS (EE) and PATERSON (DR). The affect of storage systems on sweet potato quality. *Hortscience.* 18(3); 1983; 336-8
 A double-walled, black Quonset-like structure with outside air exchange proved to be a very good alternative to large, expensive commercial storage complexes for roots of sweet potato (*Ipomoea batatas* (L.) Lam.). No significant differences were noted in important indicators of storage loss, such as intercellular space, specific gravity, or subsequent sensory qualities. AA

- 148 WALTER (WM) Jr., CATIGNANI (GL), YOW (LL) and PORTER (DH). Protein nutritional value of sweet potato flour. *J. Agric. Food Chem.* 31(5); 1983; 947-9
 "Jewel" and "Centennial" cultivars were stored until the nitrogen levels exceeded 1.8% dry basis (0.45% fresh basis). The roots were then peeled, cooked, and dehydrated by drum-drying (160 C drum surface) and forced-air-drying (60 C). The dehydrated flours were assayed for amino acid composition of an acid hydrolysate, nonprotein nitrogen, and available lysine (relative fluorescence assay, Goodno et al., 1981). The flours were then incorporated into diets for measurements of the protein efficiency ratio (PER). PER values (relative to a PER of 2.5 for ANRC casein) ranged from 2.2 to 1.3, depending upon the cultivar and dehydration treatment. Although amino acid analyses indicated little difference in levels of lysine (the first limiting amino acid for rat growth) between high- and low-PER flours, the value for available lysine correlated well with PER values. It appears that available lysine assays should be included in predicting the nutritional quality of heat-treated vegetable proteins where lysine is the limiting amino acid. AA

CASSAVA

- 149 OSUJI (GO). The effect of glutathione on the cohesiveness of pounded cassava, cocoyam, gari and yam. *J. Food Technol.* 18(3); 1983; 265-70

In order to understand the part played by glutathione on the cohesiveness of the tropical staple items of food, pounded cassava, cocoyam, gari and yam, varying amounts of glutathione were added to the foods after which the resistance to shear stress (cohesiveness) of each food was determined. In each pounded food, the added glutathione immediately increased the food's cohesiveness. There was also a linearly increasing relationship between the foods' cohesiveness and their endogenous glutathione contents on one hand and between the foods' cohesiveness and foods, protein contents on the other hand. Glutathione, therefore, increases the cohesiveness of tropical pounded foods by interacting with their proteins which then assume new conformations that increase the cohesiveness of the foods. AA

- 150 DOUGAN (J), ROBINSON (JM), SUMAR (S), HOWARD (GE) and COURSEY (DG). Some flavouring constituents of cassava and of processed cassava products. *J. Sci. Food Agric.* 34(5); 1983; 874-84

Flavouring constituents of cassava, gari and farine were analysed and compared. The characteristic compounds of gari were identified as pyrazines and lactic acid. Farine, which is either unfermented or fermented for a much shorter time than gari, was qualitatively similar but had fewer volatiles, present in small amounts. Pyrazines and lactic acid were absent from cassava, the flavouring constituents of which were fewer and qualitatively different from those of gari and farine. The characteristic flavour of gari and farine was largely due to the fermentation and roasting processes. AA

VEGETABLES

- 151 LINDSAY (RT), NEALE (MA) and MESSER (HJM). Ventilation rates for the positive ventilation of vegetables in bulk bins. *J. Agric. Eng. Res.* 28(1); 1983; 33-44
- 152 LOH (J) and BREENE (WM). A laboratory microwave sterilizer and its possible application toward improving texture of sterilized vegetables. *J. Food Process. Preserv.* 7(2); 1983; 77-92
- A microwave-permeable chamber was constructed for high temperature sterilization of foods in glass containers at overpressures up to 50 psig. Temperatures could be monitored satisfactorily in the microwave field using stainless steel shielded type T thermocouples if the metal sheath were grounded. Percent fracturability did not differ between potato samples sterilized by microwave energy (1000 W output) and steam. Extrapolation of kinetic data indicated that although fracturability retention is quite low at temperatures below 150 C (<15%), it should increase dramatically above 160 C (>60%). Verification of this will require a higher microwave output (>1000 W) than was available in these experiments. AA
- 153 VIDAL-VALVERDE (E), LOPEZ (MP) and ROJAS-HIDALGO (E). Pectic substances in raw and cooked, fresh or processed Spanish vegetables. *J. Agric. Food Chem.* 31(5); 1983; 949-53
- 154 HERRANZ (J), VIDAI-VALVERDE (C) and ROJAS-HIDALGO (E). Cellulose, hemicellulose and lignin content of raw and cooked processed vegetables. *J. Food Sci.* 48(1); 1983; 274-75

- 155 APPAIAH (KM), KAPUR (OP) and NAGARAJA (KV). Colorimetric determination of propoxur and its residues in vegetables. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 105-7

Propoxur (or o-isopropoxyphenyl N-methylcarbamate) can be estimated by hydrolyzing it, with methanolic potassium hydroxide, to its phenol, and then coupling the phenol with diazotized 4,4-diaminodiphenyl sulphone. The orange complex so formed has an absorption maximum at 500 nm and obeys Beer's law in the range of 0.25-0.50 ug/ml. The method can be applied to levels as low as 0.5 ppm propoxur from vegetables. KMD

- 156 VAN DER HOEVEN (JC), LAGERWEIJ (WJ), BRUGGEMON (IM), VORAGEN (FG) and KOEMAN (JH). Mutagenicity of extracts of some vegetables commonly consumed in the Netherlands. *J. Agric. Food Chem.* 31(5); 1983; 1020-26

LEAFY VEGETABLES

- 157 DONNELLY (PE), McDONALD (RM) and RATTRAY (PV). Protein extraction from pasture: Effect of crop season, regrowth, age and season on the quality of the extracted protein. *J. Sci. Food Agric.* 34(8); 1983; 819-27

Leaf protein concentrates were prepared from rye grass (*Lolium perenne*), white clover (*Trifolium repens*), leucerne (*Medicago sativa*) and rye grass/white clover dominant pasture, harvesting after a range of regrowth intervals in spring, summer and autumn seasons. It was found that there was no effect of season or age of herbage at harvest on the quality of protein. KAR

- 158 DONNELLY (PE), McDONALD (RM) and RATTRAY (PV). Protein extraction from pasture: Effect of crop species and of a reducing agent on the quality of extracted protein. *J. Sci. Food Agric.* 34(8); 1983; 828-38

Protein in rye grass LPC had a lower digestibility (72%) than that from white clover (81%) or lucerne (78%) due to a higher proportion of the juice, true protein being from the chloroplastic fraction for rye grass (73%) compared with the two legumes (49-56%). Metabisulphite treatment at pulping caused a small but consistent increase of chemically available lysine in the LPC, and also improved chemically available methionine and protein utilization for growth. KAR

- 159 DONNELLY (PE) and RATTRAY (PV). Protein extraction from pasture: The nutritional availability of methionine, cystine and lysine in leaf protein concentrates. *J. Sci. Food Agric.* 34(8); 1983; 839-48

Leaf protein concentrates were prepared from rye grass (*Lolium perenne*), white clover (*Trifolium repens*), mixed ryegrass/white clover and leucene (*Medicago sativa*). Total and available methionine in LPC averaged 1.94 and 1.60 g/16g N respectively which increased by adding sodium metabisulphite at pulping. Total and available cystine averaged 0.96 and 0.26 g/16 gN respectively. Available lysine averaged 5.29 and 5.61 g/16 gN for control and metabisulphite-treated LPC respectively. KAR

- 160 LYON (CK), KNOWLES (PF) and KOHLER (GO). Evaluation of *Brassica* species as leaf sources for extending the processing season of a leaf protein concentrate plant. *J. Sci. Food Agric.* 34(8); 1983; 849-54

Leaf protein concentrates (LPC) were prepared in large pilot plant equipment from seven *Brassica* varieties grown on plots of up to 0.06 ha. Plants were harvested about a month before and after the lucerne processing

season. Best yields of LPC, from leafier or forage-type species, were up to 0.9 t ha. Properties were as good as or better than those of LPC from lucerne. Lucerne processing procedures were modified to maximize yields from the more succulent *Brassica* plants. AA

- 161 MERODIO (C), MARTIN (M) and SABATER (B). Improved separation of green and soluble leaf proteins by pH shift. *J. Agric. Food Chem.* 31(5); 1983; 957-9
- The effects of pH, temperature, and detergent on the solubility of chlorophyll and protein were determined in spinach leaf juice. After precipitation, white protein dissolved better than thylakoid fragments when the pH changed. Making use of this characteristic, a method was proposed for the preparation of protein free of chlorophyll ($\leq 0.1\%$) in which the juice was successively treated at an alkaline and an acid pH and centrifuged at a low rate (2000g). With this method, yields in white protein ranging from 46 to 78% were obtained with different plants. The appropriate pH values used were specific for each plant. AA
- 162 BARBEAU (WE) and KINSELLA (JE). Factors affecting the binding of chlorogenic acid to fraction. I. Leaf protein. *J. Agric. Food Chem.* 31(5); 1983; 993-8
- 163 MALIWAL (BP). Effect of modifications in the process of preparation on nutritive value of leaf protein concentrate. *J. Food Biochem.* 7(2); 1983; 93-104
- 164 OOMAH (BD) and BUSHUK (W). Characterization of lupine proteins. *J. Food Sci.* 48(1); 1983; 38-41
- Eight cultivars of *Lupinus albus* and *L. angustifolius* were studied for solubility, amino acid composition and electrophoretic mobility of their proteins. There were differences in protein solubility among species. The solubility of proteins was altered by defatting the lupin flour. There were only minor differences among the species in amino acid composition of total protein and protein fractions. Both quantitative and qualitative differences were evident among the species with regard to sodium dodecylsulphate - polyacrylamide gel electrophoretic pattern. Overall results suggest only restricted use in food application due to high solubility of their proteins in water. The electrophoretic patterns of the fraction (patterns of globulins are variety, specific) suggest their use in identifying the variety for plant breeding and commercial grading purposes. MVG

CABBAGE

- 165 WALSH (JR), LOUGHED (EC) and TOIVONEN (PMA). The effect of benomyl, sodium hypochlorite, and controlled atmospheres upon the incidence of black speck of stored cabbage. *J. Am. Soc. Hortic. Sci.* 108(4); 1983; 533-6
- Stored cabbage developed symptoms of black speck; dipping in 500 mg/liter benomyl and 95 or 190 mg/liter chlorine increased susceptibility to black speck, but control of ethylene levels and an atmosphere of 3% O₂ + 5% CO₂ had little effect. KAR
- 166 HENDRICH (S) and BJELDANES (LF). Effects of dietary cabbage, brussels sprouts, *Illicium verum*, *Schizandra chinensis* and alfalfa on the benzo(a)pyrene metabolic system in mouse liver. *Food Chem. Toxicol.* 21(4); 1983; 479-86

Male C57B16 mice were fed on diets containing either 20% cabbage, 20%, Brussels sprouts, 20% alfalfa, 5% *Schizandra chinensis* or 5% *Illicium verum* (two Chinese medicinal herbs) or on a chow or purified basal diet for 14 days after a 1 week equilibration period on the basal diet. Liver microsomal fractions were assayed for cytochrome P-450 content, aryl hydrocarbon hydroxylase (AHH), and epoxide hydrolase (EH). Liver microsome-mediated benzo(a)pyrene (BP) metabolism (with and without an EH inhibitor, 1,2-epoxy-3,3,3-trichloropropane) was analysed by HPLC. Liver weights of the animals fed on *Brussels sprouts* and *I. verum* were significantly increased compared with those of the animals fed on basal diets. *S. chinensis* induced a 3-fold increase in cytochrome P-450 ($P < 0.05$). Although P-450 induction in the other groups was as high as 1.8-fold (for chow), statistical significance was not established. Chow induced AHH activity 2.2-fold ($P < 0.05$), while *S. chinensis* and alfalfa induced 1.6-fold and 1.7-fold increases, respectively, in AHH activity, although neither increase was statistically significant. EH was stimulated significantly in the following order: *I. verum* (2.1-fold) > chow (1.7-fold) < *S. chinensis* (1.6-fold) > *Brussels sprouts* (1.4-fold). Total levels of BP metabolism and phenol II (primarily 3-hydroxybenzo(a)pyrene) formation were closely associated for each dietary treatment. Total BP metabolism was significantly increased (2.1-fold) in the chow-fed group and increased 1.6-fold in the *S. chinensis* group ($P > 0.05$). No increase was seen with the other diets. Phenol II formation relative to total metabolites was significantly increased for the *S. chinensis* and *I. verum* groups compared to the basal group. Diet-related variations in phenol production relative to total metabolism were eliminated by addition of the EH inhibitor to the incubation media. AA

CAULIFLOWER

- 167 RODRIGUEZ (R), AGARWAL (PC) and SAHA (NK). Physico-chemical characteristics of some cauliflower cv. and their suitability for canning. *Indian Food Packer*. 37(2); 1983; 67-73

Cauliflower cultivars grown locally (Holland No.16, Burpee seed, Anjha, Lucknow Early, Snow ball and Lucknow local) were studied for their physical characteristics, chemical composition and suitability for canning. Data on crop yield/hectare, size and other characteristics of the head and chemical composition have been presented. Canned products prepared from the cultivars Snow Ball (mid season) and Lucknow Local (late season) were rated as good for colour, texture and taste and were found to be significantly superior to canned products from other cultivars in overall quality besides meeting the requirements of ASC specifications for drained weight and disintegration. These cultivars also recorded a good crop yield. The canned product from the cultivars Anjha was rated satisfactory, while the rest of the cultivars were found to be unsuitable for canning. BSN

OKRA

- 168 SAIMBHI (MS) and RANDHAWA. Shelf life of okra (*Abelmoschus esculentus* L.) Moench) as influenced by pre-packing in polyethylene bags. *Indian Food Packer*. 37(2); 1983; 63-6

Studies on the shelflife of the fruits of two okra varieties (*Abelmoschus esculentus* L. Moench) has influenced by pre-treatment in water-mustard

oil emulsion and packing in perforated and unperforated polyethylene bags of 400 and 200 gauge thickness were carried out at ambient conditions (42 C, 77.5% R.H.). Fruits packed in polyethylene bags showed the minimum weight loss and remained in good condition upto 10 days of storage. Perforated bags showed slightly more weight loss, were better in quality and had no off flavour. BSN

CAPSICUM

- 169 CHITWOOD (RL), PANGBORN (RM) and JENNINGS (W). GC/MS and sensory analysis of volatiles from three cultivars of capsicum. *Food Chem.* 11(3); 1983; 201-16

The investigation concerns the relationship between the volatile constituents and aroma characteristics of 3 commercially important California capsicums. KAR

CUCURBIT

- 170 LAL (BM), DATTA (N) and MADAAN(TR). A study of kernel oils of some cultivated cucurbits. *Qualitas Plantarum.* 32(1); 1983; 83-5

Oil content of the seed-kernels of 15 species of *Cucurbitaceae* family has been estimated. It ranged from 37.9 to 56.5%. The iodine values of the oils were from 87.8 to 149.9. Most of these oils were nearly colourless, odourless and of good appearance. The oil-free kernel meals of different cucurbit species had protein content ranging from 60 to 70%. AA

PUMPKIN

- 171 LONGE (OG), FARINU (GO) and FETUGA (BL). Nutritional value of the fluted pumpkin (*Telfaria occidentalis*). *J. Agric. Food Chem.* 31(5); 1983; 989-92

LUPIN

- 172 AGUILERA (JM), GERNGROSS (MF) and LUSAS (EW). Aqueous processing of lupin seed. *J. Food Technol.* 18(3); 1983; 327-33

Processing of two species of lupin seed by an aqueous extraction process has been explored and the resulting products have been examined. It has been shown that aqueous processing is an effective method for the separation of oil protein and alkaloids of lupin seeds. AA

FRUITS

- 173 ANON. Canned fruits and vegetables in the Federal Republic of Germany. *Indian Food Packer.* 37(2); 1983; 20-37

Aspects covered include: importers and agents; central buying groups and large multiples; industrial users; recommendations for exporters in developing countries; addresses of trade and professional organisations;

including those of importers/agents. Market profile for different types of fruit products is also included. The quantity imported from different countries during 1975, 1977 and 1979 is also given. BSN

- 174 SATYAN (SH) and PATWARDHAN (MV). Organic acid metabolism during ripening of fruits. *Indian J. Biochem. Biophys.* 20(5); 1983; 311-4
 The metabolism of organic acids during ripening of some fruits (mango, apple, orange and banana) was followed by incorporation of labelled organic acids in various fraction of fruits. In apple and orange, there was an appreciable increase in percentage incorporation of the label into CO₂ during ripening. In mango, there was maximum incorporation of the label into sugar fraction which increased during ripening with concomitant decrease in retention of label in organic acid fractions; this indicated a possible increase in gluconogenic conversion of organic acids into sugars during ripening of mango. Banana retained radioactivity in organic acid fraction to the maximum extent which increased during ripening, thus indicating lesser utilisation of organic acids in ripening. MVG
- 175 BOLIN (HR) HUXSOLL (CC) and JACKSON (R). Direct gas sulphuring of fruits for drying to reduce air pollution. *J. Food Process. Preserv.* 7(2); 1983; 67-76
 In using direct gas injection, less sulphur dioxide was wasted than in burning; 33-84% being absorbed by pears, peaches, and apricots compared to 5-34% by burning. Neither external fans nor heating of the gas before injection were necessary to obtain adequate dispersion throughout the house. An economical procedure was developed for modifying existing sulphur houses, so that bottled gas could be used. The operational cost of using this procedure should be similar to the burning method. The direct gas sulphuring procedure provided better control and also minimized atmospheric air pollution. AA
- 176 BOLIN (HR), HUXSOLL (CC), JACKSON (R) and NG (KC). Effect of osmotic agents and concentration on fruit quality. *J. Food Sci.* 48(1); 1983; 202-5
 Osmotic syrups can be reconcentrated and reused for osmotic water removal through at least five complete cycles without adversely affecting the fruit being concentrated, even though the properties of the osmotic medium do change. Syrup penetration rate into a fruit piece was faster with high fructose corn syrup (HFCS) than sucrose. Taste panel evaluation indicated that overall, sucrose was preferred as an osmotic medium over HFCS. AA
- 177 LUND (ED), SMOOT (JM) and HALL (NT). Dietary fiber content of eleven tropical fruits and vegetables. *J. Agric. Food Chem.* 31(5); 1983; 1013-6
 Dietary fiber was determined in the following samples: yam, malanga, cassava, taro, avocado, date, coconut, calabaza, grapefruit albedo, and kiwi. Values were obtained for cellulose, hemicellulose, lignin, cutin, ash, neutral detergent residue (NDR), and enzymatic (soluble and insoluble) fractions. Ranges were (percent of fresh weight) as follows: for NDR, 0.53-8.6%; for cellulose, 0.20-3.8%; for hemicellulose, 0.07-4.2%; for lignin, 0.051-2.01%; for enzymatic insoluble, 0.91-6.9%; for enzymatic soluble, 0.64-4.7%. Cellulose and hemicellulose were most concentrated in coconut, and lignin was highest in dates. The enzymatic-soluble fraction was exceptionally high in the yam, *Dioscorea rotundata*, and in grapefruit albedo. AA

- 178 NIEMAND (JG), DRIJVER (LD), PRETORIUS (CJ), HOLZAPFEL (CW) and van der LINDE (HJ). A study of the mutagenicity of irradiated sugar solutions: Implications for the radiation preservation of subtropical fruits. *J. Agric. Food Chem.* 31(5); 1983; 1016-20
- A comprehensive investigation of the γ -radiolysis of sugars present in subtropical fruit was carried out and mutagenicity against *Salmonella* tester strain TA 100 demonstrated. An attempt was made to identify the products responsible for the mutagenic activity of irradiated sugar solutions and glucosone was implicated as a mutagenic agent. Irradiated mango fruit was found not to be mutagenic. The effect of fruit components on the mutagen glucosone was investigated and a decrease in activity demonstrated. The implications of these findings for the safety of radurized foods are discussed. AA
- 179 DENNIS (C). Yeast spoilage of fruit and vegetable products. *Indian Food Packer.* 37(2); 1983; 38-5
- Aspects covered include; spoilage of fresh fruits and vegetables; spoilage of processed fruits and vegetables; salt brined vegetables; acetic acid preserves; sulphited fruit; canned and bottled fruit; jam, jellies, and preserves; and mayonnaise-based salads. BSN
- 180 WUEST (O) and MEIER (W). Determination of seven carbamate insecticides on fruits and vegetables. *Lebensmittel Unters Forsch.* 177(1); 1983; 25-9 (German)

DATE

- 181 SAWAYA (WN), KHATCHADOURIAN (HA), KHALIL (JK) and MASHADI (AS). Processing of three major Saudi Arabian date cultivars into jam. *J. Food Sci. Technol. (India)* 20(4); 1983; 149-52
- Jams were prepared from Saudi Arabian date cultivars 'Khodari', 'Sullaj' and 'Sifri' with and without the addition of flavours. Slight variations were made in the jam recipes of the three cultivars by altering the citric acid and pulp content. The jams were processed in a pilot plant and were tested for physico-chemical and organoleptic characteristics. All the jams conformed to the desired product standards. Sensory evaluation tests also showed that acceptable jams could be prepared from the three cultivars. Addition of orange, grapefruit, banana and almond flavours at specific levels to jams made the jams equally acceptable. KAR

BLUEBERRY

- 182 HORVAT (RJ), SENTER (SD) and DEKAZOS (ED). GLC-MS analysis of volatile constituents in rabbiteye blueberries. *J. Food Sci.* 48(1); 1983; 278-9
- 183 HIRVI (T) and HONKANEN (E). The aroma of blueberries. *J. Sci. Food Agric.* 34(9); 1983; 992-8
- The volatile components of blueberry, bog berry, and cultivated high-bush blueberry were analysed by GC and MS. Several new compounds not reported so far were detected including methyl and ethyl 2-hydroxy-3-methylbutanoate, methyl and ethyl 3-hydroxy-3-methylbutanoate, 2-phenylethyl formate, methylsalicylate, farnesol, farnesyl acetate, vanillin, myristicine, 4-vinylphenol, 2-methoxy-5-vinylphenol, citronellol, hydroxycitronellol, and some α - and β -lactones. KAR

PASSION FRUIT

- 184 SPENCER (KC) and SEIGLER (DS). Cyanogenesis of *passiflora edulis*. *J. Agric. Food Chem.* 31(4); 1983; 794-6

The cyanogenesis of *Passiflora edulis* has been identified as prunasin (2(R)-(β-D-glucopyranosyloxy)-2-phenylacetonitrile) by ¹H-NMR. Fruits contain the maximum amount of cyanide when immature, losing most of it during ripening. Between edible and nonedible portions of fruit, no significant differences were observed. BSN

- 185 ENGEL (K-H) and TRESSL (R). Formation of aroma components from nonvolatile precursors in passion fruit. *J. Agric. Food Chem.* 31(5); 1983; 998-1002

STRAWBERRY

- 186 HYVONEN (L) and TORMA (R). Examination of sugars, sugar alcohols, and artificial sweeteners as substitutes for sucrose in strawberry jam product development. *J. Food Sci.* 48(1); 1983; 183-5, 192

The study points out the feasibility of preparing acceptable jams with lower amounts of sucrose than currently used and replacement of sucrose by other sweeteners or combinations of sweeteners. Of the sweetness (sucrose, fructose, high fructose syrup, xylitol, sorbitol, lactose, saccharin, cyclamate), xylitol and sorbitol presented difficulties in giving suitable texture. Maltodextrin as the bulking agent has the limitation of causing abnormal appearance and taste in the product. MVG

- 187 HYVONEN (L) and TORMA (R). Examination of sugars, sugar alcohols, and artificial sweeteners as substitutes for sucrose in strawberry jam. Keeping quality tests. *J. Food Sci.* 48(1); 1983; 186-92

In general, xylitol and sorbitol jams and other jams containing some amount of xylitol kept well during refrigerated or room temperature storage for 10 months. High fructose syrup and fructose jams deteriorated in colour, taste and preference than most other jams; use of xylitol in these jams retarded these changes. Jams with xylitol-maltodextrin crystallised during storage and were unfit for sensory evaluation. MVG

GRAPE

- 188 KOLOR (MG). Identification of an important new flavour compound in Concord grape: Ethyl 3-mercaptopropionate. *J. Agric. Food Chem.* 31(5); 1983; 1125-7

Ethyl 3-mercaptopropionate was isolated and identified for the first time in Concord grape by combination gas chromatography-mass spectrometry analysis. At low concentration this compound possesses high-quality Concord grape aroma and flavour. AA

BANANA

- 189 MOWLAH (G), TAKANO (K), KAMOI (I) and OBARA (T). Water transport mechanism and some aspects of quality changes during air dehydration of bananas. *Food Sci. + Technol.* 16(2); 1983; 103-7

Despite the complex nature of the mechanism of moisture transport, and the unsteady state process with respect to both moisture content and temperature, it was found that Fick's law of diffusion can be applied, with a fair degree of accuracy, to predict the moisture and temperature distribution pattern, as well as the average drying time of a banana dice sample. Both unblanched and blanched banana slices became brown during air drying, and browning increased sharply after 90% of the moisture had evaporated. KMD

CITRUS

- 190 RANGANNA (S), GOVINDARAJAN (VS) and RAMANA (KVR). Citrus fruits. Part II. Chemistry, technology and quality evaluation. B. Technology. *CRC Crit. Rev. Food Sci. Nutr.* 19(1); 1983; 1-98

Discusses technology of citrus products under: orange juice (varieties of orange, transportation, handling and grading, processing, washing, sorting, juice extraction, juice blending, specifications, manufacture of chilled orange juice, canned orange juice, packing, storage); mandarin juice, canned or bottled juice for infants; grapefruit juice; lemon and lime juice; bitterness in citrus juices and its control (flavonoid and limonoid bitterness and control); manufacture of citrus juice concentrates (orange juice concentrate preparation, processing, storage); type of evaporators - low temperature, HTST, centrifugal and mechanically agitated evaporators; concentration by freezing or reverse osmosis; evaluation of evaporators; aroma recovery; preparation, packaging and storage of concentrates, beverage base from concentrates-ready-to-serve beverages, chemically preserved citrus beverages; cloud in citrus juice products - composition, stability and clarification, storage and changes during processing and storage; citrus juice powders; grape fruit, sweet orange and mandarin segments - crushing, preparation of jam, jelly, marmalades; speciality citrus products and utilization of by products; and disposal of liquid wastes. BSN

- 191 OTT (DE) and GUNTHER (FA). Colorimetric method for field-screening above-tolerance parathion residues on and in citrus fruits. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 108-10

The method depends on a colour reaction between parathion and 4-(p-nitrobenzyl)/pyridine. The coloured reaction medium is read at 560 nm by means of a portable, rechargeable spectrophotometer. A single test can be completed in 75 minutes. The analytical system responds readily to <5 ppm parathion on or in 1 g of navel orange rind, which corresponds to <1 ppm in the whole fruit. The present US tolerance for parathion on or in citrus is 1 ppm on a whole fruit basis. Preliminary work indicates that the method should be suitable for apples also. Thus, a citrus grower can now postpone harvesting of a crop until the parathion residues fall below the tolerance level. KMD

GRAPEFRUIT

- 192 PURVIS (AC). Effects of film thickness and storage temperature on water loss and internal quality of seal-packaged grapefruit. *J. Am. Soc. Hortic. Sci.* 108(4); 1983; 562-6

'Marsh' grapefruit (*Citrus paradisi* Macf.) were seal-packaged in low-density, polyethylene films ranging from 20 to 40 μ m in thickness and stored at temperatures from 5 to 28 C for periods up to 109 days. Film thickness had a negligible effect on transpiration, respiratory gas exchange, and juice quality. Storage temperature had a negligible effect on transpiration of seal-packaged fruit. However, 28 C storage temperature significantly affected acid concentration in both seal-packaged and unwaxed fruit, probably as a result of increased respiratory activity at high storage temperatures. Quality of both seal-packaged fruit and unwaxed fruit deteriorated in storage at 28 C. AA

LEMON

- 193 JOSAN (JS), SHARMA (JN) and CHOCHAN (GS). Degreened lemons: an approach to higher income. *Indian Hortic.* 27(4); 1983; 17

A method of degreening lemon fruit by treatment with ethrel (2-chloro-ethanephosphonic acid) is reported. Dipping in 2500 ppm. ethrel solution and packaging in polythene film before storage at room temperature gave a characteristic lemon colour in 86.7% of fruits on the 3rd day. The polyethylene film also helped retention of proper firmness, minimum loss of weight and fresh appearance of the fruits. The fruit quality was also better, and treated fruits fetched higher rates in the market. Detailed economics for treating 50 kg fruits has been worked out. MVG

LIME

- 194 PINO (JA) and TAPANES (R). Evaluation of a process for obtaining partially concentrated lime oil. *J. Food Technol.* 18(4); 1983; 523-8

ORANGE

- 195 EL-KAZZAZ (MK), CHORDAS (A) and KADER (AA). Physiological and compositional changes in orange fruit in relation to modification of their susceptibility to *Penicillium italicum* by ethylene treatments. *J. Am. Soc. Hortic. Sci.* 108(4); 1983; 618-21

Exposure of orange fruit to 1000 μ l/litre C₂H₄ at 20 C for 2 to 6 days before inoculation with *Penicillium italicum* Wehnur reduced fungal growth. Ethylene treatments with or without inoculation did not influence soluble solids, pH, titratable acidity, or total phenolic contents of fruit juice. KAR

CITRULLUS

- 196 SAWAYA (WN), DAGHIR (NJ) and KHAN (P). Chemical characterization and edibility of the oil extracted from *Citrullus colocynthis* seeds. *J. Food Sci.* 48(1); 1983; 104-6, 110

The characteristics and composition of the crude oil extracted from *Citrullus colocynthis* seeds were examined. Data obtained for the iodine value, saponification number, Reichert-Meissl and others compare well with other edible oils. Thin-layer chromatography in conjunction with gas-liquid chromatography-mass spectrometry revealed over 75% degree of unsaturation major among which were linoleic, 50.6% and oleic acids, 25%. Upon storage, the oil showed relatively low peroxide values that were within the acceptable limits set for other vegetable oils. Animal experimentation trials on the oil using chicks as the experimental animals did not show any toxicity effects. Based on these results, *Citrullus colocynthis* oil might be of some potential use for animal feed and/or human consumption. AA

- 197 ODUNFA (SA). Biochemical changes during production of *ogiri*, a fermented melon (*Citrullus vulgaris* Schard) product. *Qualitas Plantarum*. 32(1); 1983; 11-8

MANGO

- 198 SALVI (PV). 'Ratna' - A new mango variety. *Indian Hortic.* 27(4); 1983; 13

The new mango variety gives large fruits (average weight 315 g) which are ovate - oblique and slightly elongated and of greenish orange colour with prominent oil glands. The flesh is firm and fibreless and the fruits keep in good condition for about a week. They contain no spongy tissue. The fruit pulp has a pleasant sugar-acid blend with good flavour. MVG

- 199 ENGEL (K-H) and TRESSL (R). Studies on the volatile components of two mango varieties. *J. Agric. Food Chem.* 31(4); 1983; 796-801

The volatile composition of two mango varieties (Alphonso and Baladi) was investigated by means of standard-controlled distillation-extraction, liquid-solid chromatography, and gas chromatography-mass spectrometry. This combination led to the characterization of a spectrum of 114 components of which 81 were identified for the first time as mango constituents. In addition to this qualitative identification, the concentrations of the components were quantitatively determined in a range from 40 ppm to the ppb trace level. By this method clear differences between the two mango varieties could be demonstrated. AA

AVOCADO

- 200 BARRY (GA), BROWN (BI) and BARKER (LR). The use of low resolution nuclear magnetic resonance for determining avocado maturity by oil content. *J. Food Technol.* 18(4); 1983; 401-10

A method for determining oil content of dried avocado flesh using a low resolution nuclear magnetic resonance (NMR) spectrometer is described. Forty samples were analyzed for oil content by NMR, Soxhlet extraction and refractive index (RI) methods. Percentage of oil by NMR was more closely

correlated with Soxhlet extracted oil ($r=0.978$) than was percentage of oil determined by a RI method ($r=0.853$). Advantages of using the NMR technique in avocados are simplicity, speed, low operator errors and the elimination of the use of dangerous or inflammable solvents. A reproducibility relative standard deviation (S.D.) of 0.6% was obtained. AA

APPLE

- 201 MAST (G) and FELDHEIM (W). Sensory evaluation, content of malate and sucrose, and fruit firmness of different apple varieties. II. Relation between sensory evaluation and chemical and physical parameters. *Z. Lebensmittel. Unters. Forsch.* 177(5); 1983; 30-33 (German)
Parallel to a detailed sensory evaluation of the apple varieties "Jamba", "Holsteiner Cox", "Red Holsteiner Cox" and "Gloster" the content of malate and sucrose and fruit flesh firmness were measured. There was a closer relationship between sensory fruit flesh assessment and flesh firmness with a firmness of 5-5,3 kp/cm² or higher sensory evaluation was not worse than fair. AA
- 202 SERRATOS (HR), MANNHEIM (CH) and PASSY (N). Sulphur dioxide and carbon dioxide gas treatment of apples for enzyme inhibition prior to freezing. *J. Food Process. Preserv.* 7(2); 1983; 93-104
Carbon monoxide was found ineffective as enzyme inhibitor when catalase and polyphenol oxidase were used in the treatment of apples. SO₂ treatment of apples was found to inhibit enzyme activity as effectively as thermal blanching and was maintained for 195 days at -8 and -18 C; loss of soluble solids was also found to be lower than in the blanched samples. Blanched apples retained greener colour, while SO₂ treated apples were yellow. Significant differences were not observed in sensory scores of apples between the two treatments. The residual SO₂ level could be reduced to below 50 ppm. BSN
- 203 O'BEIRNE (D) and VAN BUREN (JP). Size distribution of high weight species in pectin fraction from idared apples. *J. Food Sci.* 48(1); 1983; 276-77
The apparent MW of two apple pectin fractions were investigated using gel permeation chromatography. Both fractions behaved similarly on Sephadex G 200, Sepharose 6B, and Bio Gel 50m. Seventy percent of galacturonic acid residues eluted in a continuous distribution in the range 12.5 million to 1 million Daltons. Ten percent lay above this range; twenty percent below. These high weight species (possibly aggregates) do not appear to be artifact of the extraction and handling procedures used, and may reflect an intrinsic property of some pectic substances. AA
- 204 DePOOTER (HL), MONTENS (JP), WILLAERT (GA), DIRINCK (PJ) and SCHAMP (NM). Treatment of Golden Delicious apples with aldehydes and carboxylic acids: Effect on the headspace composition. *J. Agric. Food Chem.* 31(4); 1983; 813-8
Application of vapours of C₃ to C₆-aldehydes or C₂- to C₆-carboxylic acids to intact Golden Delicious apples results in the formation of alcohols and esters. The aldehydes are either transformed into the corresponding alcohols and esterified with carboxylic acids present in the tissues or (to a small degree) oxidized into the acids, which combine with alcohols present as such, or derived from the aldehydes. Carboxylic acids yield

either esters or alcohols (probably by way of the aldehydes) or smaller carboxylic acids by β -oxidation where possible, which are then in turn used as the substrate. While these additions have a great impact on the total composition of the headspace, as shown by GLC after enrichment on Tenax GC, no large or reproducible effect on the flavour of treated fruits could be demonstrated organoleptically. AA

- 205 LAU (OL). Storage responses of four apple cultivars to a "Rapid CA" procedure in commercial controlled-atmosphere facilities. *J. Am. Soc. Hortic. Sci.* 108(4); 1983; 530-33

Commercial applications of a "rapid CA" procedure (short loading time and rapid reduction of storage O_2 to 2.5%) significantly improved retention of flesh firmness and juice acidity in controlled atmosphere stored apples. Varietal response to "rapid CA" was also observed. KAR

- 206 WILLAERT (GA), DIRINCK (PJ), DePOOTER (HL) and SCHAMP (NN). Objective measurement of aroma quality of Golden Delicious apples as a function of controlled-atmosphere storage time. *J. Agric. Food Chem.* 31(4); 1983; 809-13

Flavour quality of Golden Delicious apples as a function of controlled-atmosphere storage time is studied by using aroma analysis as an objective criterium. For representative aroma isolation, a fast headspace concentration technique, which isolates the volatiles released during maceration of the fruits, is used. As flavour quality is a dynamic process, the evolution of volatiles as a function of ripening after removal from controlled atmosphere is followed for six periods during the storage season. Results objectively indicate an important decrease in aroma quality after long controlled-atmosphere storage (CA storage). AA

PEAR

- 207 RAO (VS) and YADAV (DS). Mixed fruit jam from pear and pineapple. *Indian J. Agric. Sci.* 53(7); 1983; 618-9

Three combinations of pear (China and Smith varieties) and pineapple (Queen and Kew varieties), namely 75% pear + 25% pineapple, 50% pear + 50% pineapple, and 25% pear + 75% pineapple were tried for jam making. The jam prepared was filled in cans (A 2½ size) and stored at room temperature (25-30 C). Organoleptic evaluation of the stored jam indicated that all the combinations were acceptable. However, the overall rating and the ratings of colour, flavour and texture increased with an increase in the proportion of pineapple in the jam. MVG

PAPAYA

- 208 MACLEOD (AJ) and PIERIS (NM). Volatile components of papaya (*Carica papaya* L.) with particular reference to glucosinolate products. *J. Agric. Food Chem.* 31(5); 1983; 1005-8

The aroma volatiles of fresh papaya fruit from Sri Lanka were extracted and concentrated to a valid essence by using well-established techniques. Analysis by GC and GC-MS showed at least 50 components (total about 97 μ g/kg of fruit), of which 18 were identified for the first time as papaya volatiles. Esters afforded the most abundant group of compounds, with methyl butanoate being the major constituent (about 48% w/w of the sample). It is

suggested that this component is the one mainly responsible for the pronounced sweaty odour quality of some papaya fruit. Many significant differences were observed between these results and those previously obtained for Hawaiian papaya. Products of benzylglucosinolate degradation were identified in relatively large amounts in both fruit and seeds of papaya, but no benzyl thiocyanate could be detected despite high-sensitivity searches by means of multipeak monitoring GC-MS. Similarly, no methylglucosinolate degradation products could be detected, and it was not possible to conform previous identification of methyl thiocyanate. AA

- 209 RAWAL (RD), MUNIYAPPA (NC) and ULLASA (BA). Effect of preharvest field sprays of fungicides on the control of storage rot of papaya. *Indian J. Agric. Sci.* 53(7); 1983; 614/5

Papaya plants were sprayed 6 times at 15, 30 and 45 days intervals with bavistin((0.1%), benomyl (0.1%), bayleton (0.1%), baycor (0.1%) methylthiophenate (0.1%), daconil (0.2%) and blue copper (0.3%) to control anthracnose caused by *Colletotrichum gloeosporioides* Penz during storage. It was found that two sprays either with bavistin at 45 day intervals or with daconil at 15-day intervals minimized the disease after harvest. MVG

GUAVA

- 210 NATH (N) and RANGANNA (S). Determination of a thermal process schedule for guava (*Psidium guajava* Linn.). *J. Food Technol.* 18(3); 1983; 301-16

A thermal process schedule for guava canned in syrup has been evolved on the basis of inactivation of pectinesterase (PE) which was found to be more heat resistant than peroxidase. The values for thermal inactivation and thermal resistance of PE in syrup homogenate containing guava pulp and sugar syrup in the ratio of 11:6 and total soluble solids content of 20% at pH 4.0 were $F_{29.22}^{205.1} = 1.0$ and $D_{29.81}^{205.1} = 0.592$ respectively. The F value of 1 was equivalent to 1.69 D. In commercial canning, a 2.5 D process is recommended which ensures a microbiologically safe and organoleptically acceptable product. Process time was calculated both by graphical and formula methods. Calculation by the formula method using slopes of heating and cooling curves plotted on semilog paper by least squares analysis, and $f_h/U:g$ tables for actual values of j_c gave process times very close to those obtained by the graphical method. The process times required at different initial and processing temperatures are given. To minimize viscosity increase in the covering syrup during storage, firming of guava in 1% calcium chloride solutions for 30 minutes prior to canning is suggested. In addition, use of covering syrup containing 0.125% ascorbic acid with or without citric acid (0.06%) yields a product of good colour, texture and flavour. AA

- 211 NATH (N), SIDDALINGU and RANGANNA (S). Heat transfer characteristics and process requirements for hot-filled guava pulp. *J. Food Technol.* 18(3); 1983; 317-26

In the in-can processing of canned fruit pulp in batches, the pulp is filled hot into cans, sealed, processed and cooled. The hold-up time between sealing and processing may vary from 10 to 30 minutes when the temperature of pulp decreases in the peripheral regions. During processing and cooling, temperature changes in the peripheral regions are rapid but not so, in regions near geometric centre. In guava pulp filled into cans at

170 F (76.9 C) or above, the desired F value is achieved at the geometric centre even without processing but not so at other regions. The point of minimum lethality shifts from the geometric centre towards the periphery with an increase in the filling temperature and a decrease in the hold-up time. Based on these findings, a thermal process schedule has been evolved for canned guava pulp with different filling temperatures and a hold-up time of 10 and 30 minutes. AA

BER

- 212 SOLANKE (SP) and CHAKRAWAR (VR). Quality evaluation of Ber strains (*Zizyphus mauritiana* Lamk). *Indian Food Packer*. 37(2); 1983; 96-102
- Fruits picked between November and January from plants belonging to 46 ber strains (*Zizyphus mauritiana* Lamk) were evaluated for their physico-chemical characteristics ((i) weight, (ii) volume, (iii) size, (iv) colour, (v) shape, (vi) apex, (vii) stone weight, (viii) pulp %, (ix) soluble solids, (x) acidity, (xi) vitamin C, (xii) reducing sugars, (xiii) total sugars, (xiv) type of bearing (yield), (xv) taste and flavour and (xvi) incidence of borer), with a view to assess their suitability for canning and dehydration. In strains PBN 35, 32, and 40, (viii) was found to be maximum among all the other strains, while (x) and (xi) were present in highest amounts in strains PBN 27, 35 and 36 and PBN 19, 24 and 26 respectively. On the basis of their study, strains PBN 35, 37, 32 and 38 are superior in fruit quality and productivity. Strains with high content of (viii) and (ix) are found suitable for canning and dehydration. BSN
- 213 GUPTA (OP). Delicious candy from ber fruits. *Indian Hortic*. 28(1); 1983; 25,27
- Healthy and mature ber fruits were cleaned, pricked, blanched in steam for 5-10 minutes and dipped in 40% sugar solution in the ratio of 1 kg of sugar solution to 2 kg of fruits. The fruits were kept in solution till the concentration of sugar in the fruits and solution equalises at about 60% by periodically adding more sugar. The fruits were then partially dried at 40 ± 5 C and the candy so obtained contained about 12% moisture. The candies were wrapped in butter paper and kept in glass bottles or packed in polythene. The candy has long storage life, delicious in taste, contains 75-80% total sugars, 40-45% reducing sugars, 10-15 mg/100 g of vitamin C, 0.4 to 0.5% acidity and 12-15% moisture. MVG

OLIVE

- 214 BALATSOURAS (G), TSIBRI (A), DALLES (T) and DOUTSIAS (G). Effects of fermentation and its control on the sensory characteristics of conservolea variety green olives. *Appl. Environ. Microbiol.* 46(1); 1983; 68-74

SUGAR, STARCH AND CONFECTIONERY

- 215 FULCHER (RG), WOOD (PJ) and YIU (SH). Insights into food carbohydrates through fluorescence microscopy. *Food Technol.* 38(1); 1984; 101-6
- This article will outline the basic characteristics of the fluores-

cence microscope and provide several examples of its application in food research. Most of the examples relate to characterization of nonstarchy carbohydrates, and in several instances these essentially microscopic techniques have been adapted to routine analysis of products or processing conditions in industrial laboratories. These techniques have been developed in recognition of the fact that all seed reserves are confined to particular regions or tissues of a grain and are invariably stored in specific cellular structures. This "morphological" aspect of grain quality is as important a contributor to digestibility, extractability, and functional properties of grain components as any other chemical parameter. AA

- 216 REISER (S). Metabolic aspects of nonstarch polysaccharides. *Food Technol.* 38(1); 1984; 107-13

This review article will focus on the effects of some of the individual polysaccharides constituting the various classes of dietary fiber on metabolic risk factors associated with heart disease (i.e. blood lipids) and adult-onset diabetes (i.e. glucose tolerance parameters). Mechanisms proposed to explain the metabolic effects of these polysaccharides will be discussed. In addition, studies suggesting a positive nutritional role for bacterial oligo- and polysaccharides which inhibit intestinal α -glucosidase activity will also be described. AA

- 217 HOSENEY (RC). Functional properties of pentosans in baked foods. *Food Technol.* 38(1); 1984; 114-7

Pentosans are defined as polymers that contain a substantial amount of pentose sugars. Many of the pentosans thus defined may contain various hexoses, proteins, and other entities. This article will discuss these pentosans and their functionality in baked foods. AA

- 218 DEVRIES (JW), CHANG (HL), HEROFF (JC) and JOHNSON (KD). Elimination of sodium chloride interference during high pressure liquid chromatographic determination of sugars. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 197-8

- 219 KEMPT (W). II International symposium "Chemistry and Technology of Starch" at Krakow. *Starch.* 35(4); 1983; 140-41 (German)

- 220 HEMMERSBACH (K). Principles of heat-power cogeneration, with starch manufacture as an example. *Starch.* 35(1); 1983; 1-4 (German)

Combined generation of heat and electric power enables one to make the most economic use of primary fuels with minimal disturbance of the environment. Co-generation systems have an overall efficiency of 80-90%, compared to the 30-40% efficiency of systems generating electric power alone. The structure of the heat-power demand in the starch industry is well suited to co-generation of heat and power. KMD

- 221 SONI (PL) and AGARWAL (A). The starch of *Pueraria tuberosa* - comparison with maize starch. *Starch.* 35(1); 1983; 4-7

Pueraria tuberosa starch was isolated from the tuber and purified. Scanning electron microscopy of the starch showed polygonal shaped granules which were almost of the same particle size as those of maize starch. *P. tuberosa* starch has lower amylose content, almost same gelatinization temperature range and water binding capacity, more swelling and solubility compared to maize starch. Paste viscosity characteristics show high peak viscosity but also indicate fragile nature of granules in comparison to maize starch. AA

- 222 BLEIER (Von J) and KLAUSHOFER (H). Experiments for the structural analysis of citrate starches. Part 2. Structural models of individual citric acid esters of amylose and amylopectin. *Starch*. 35(1); 1983; 12-5 (German)
- Starting from a cluster model of the amylopectin (scale = 1;10 million) made from threads of wool and an amylose model built from parts of a molecule kit some sterically possible citric acid esters of starch are shown two dimensionally, and the question of the existence of tri-esters in citrate starches is discussed. AA
- 223 LORENZ (K), COLLINS (F) and KULP (K). Physico-chemical properties of defatted heat-moisture treated starches. *Starch*. 35(4); 1983; 123-9
- 224 FECSKE (A). Small diameter multiple hydrocyclone for starch processing. *Starch*. 35(4); 1983; 109-13
- 225 WHITE (JW) and ROBINSON (FA). $^{13}\text{C}/^{12}\text{C}$ ratios of citrus honeys and nectars, and their regulatory implications. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 1-3
- It has been demonstrated that $\delta^{13}\text{C}$ of citrus honey is significantly less negative than that of other honey types. The less negative values are not due to the inadvertant mixing of cane or corn syrups used for the spring feeding of the bee colonies previous to the citrus nectar flow. Means for identifying citrus honey and specific limiting values of $\delta^{13}\text{C}$ for adulteration testing of this honey type have been proposed. KMD

CONFECTIONERY

- 226 ROSSELL (JB). Fats for chocolate convertures and coatings. *Food Flavour. Ingrid. Packag. Process.* 5(10); 1983; 28-32. 57
- Discusses: polymorphism; lauric fat; hydrogenated fat frictions; cocoa butter equivalents; super coatings; approved levels of usage. BSN

BAKERY PRODUCTS

BREAD

- 227 NAYINI (NR) and MARKAKIS (P). Effect of fermentation time on the inositol phosphates of bread. *J. Food Sci.* 48(1); 1983; 262-3
- Bread was made by an AACC procedure using whole wheat flour and 70%-extraction wheat flour. Five different fermentation times were applied. Six inositol-phosphates and inorganic phosphate were separated, identified and quantified in the bread. It was found that phytate decreased and the inorganic phosphate increased, with the largest decrease in phytate occurring during first 30 minutes of fermentation. The content in intermediate inositol phosphates also changed and it was only after considering their phosphorus content that an overall phosphorus balance could be achieved. AA
- 228 FARIDI (HA), FINNEY (PL) and RUBENTHALER (GL). Iranian flat breads: Relative bioavailability of zinc. *J. Food Sci.* 48(1); 1983; 107-10

BISCUIT

- 229 WEDZICHA (BL) and QUINE (DEC). Sorption of water vapour by wafer biscuits. The effect of components, ingredients and the baking process. *Food Sci. + Technol.* 16(2); 1983; 115-8

The sorption of water vapour by wafers follows the BET isotherm for water activities less than 0.53. The component controlling the extent of the water monolayer is starch. This component undergoes a physicochemical change during baking reducing its monolayer value from 9.3% to 5.1%. AA

CRACKER

- 230 KAHN (CB) and PENFIELD (M). Snack crackers containing whole-grain triticale flour: Crispness, taste, and acceptability. *J. Food Sci.* 48(1); 1983; 266-7

CAKE

- 231 FISHER (N), BERRY (R) and HARDY (J). Short-term toxicity study in rats of chlorinated cake flour. *Food Chem. Toxicol.* 21(4); 1983; 423-6

Chlorinated (1257 or 2506 ppm of chlorine) and unchlorinated flours were fed to Wistar male/female rats (experimental period 28 days). No significant organ weights were noticeable but on adjusting weights to covariance with body weight increases in the kidney weight of males and liver weight of females were observed; these increases were dose-related. JVS

- 232 FISHER (N), HUTCHINSON (JB), BERRY (B), HARDY (J) and GINOCCHIO (AV). Long-term toxicity and carcinogenicity studies of cake made from chlorinated flour. I. Studies in rats. *Food Chem. Toxicol.* 21(4); 1983; 427-34

Wistar rats were fed (104 weeks) cake prepared from chlorinated (1250 or 2500 ppm chlorine) or unchlorinated flour; this constituted 79% of diet, the moisture being 12.6%. A group was also fed a stock diet, namely 41B. Differences in appearance, health, behaviour and mortality due to treatment were not noticeable. Female mortalities were higher than those of males fed cake-based diets as compared to those on 41B diet. Dose-related increase in plasma alanine and aspartate amino transferases of males, diminished sugar levels and of post-mortem spleen weight of females were important changes. Glomerulonephrosis was noticed earlier in rats fed cake than in those fed 41B. Nephrocorleiosis was also found in rats fed cakes. Increased splenic haematopoiesis occurred in about 50% of the females in cake diet group; it was less frequent in males or rats on 41B. Tumours were like those found in rats, mainly chromophobe adenomas of the pituitary. 2 males rats in the groups fed chlorinated flour showed insulomas. JVS

- 233 GINOCCHIO (AV), FISHER (N), HUTCHINSON (JB), BERRY (R) and HARDY (J). Long-term toxicity and carcinogenicity studies of cake made from chlorinated flour. 2. Studies in mice. *Food Chem. Toxicol.* 21(4); 1983; 435-9

Male and female mice were fed cakes (for 16 and 17 weeks respectively) based on flour containing 0, 1250 or 2500 ppm of chlorine; this diet formed 79% by weight, the moisture being 12.6%. Animals on cake diets increased in weight while those based on flour diet were unaffected. Females showed more mortality when fed treated flour than with cake control after 12 months

in 1250 group and after 15 months in 2500 group. Haematological, biochemical and renal function studied did not reveal any treatment - related consistency. Increase in heart weight and kidney weight as also decreased ovary weight according to dosage were seen in females. JVS

MILK AND DIARY PRODUCTS

MILK

- 234 BERTSCH (AJ) and CERF (O). Dynamic viscosities of milk and cream from 70 to 135 C. *J. Dairy Res.* 50(2); 1983; 193-200
- 235 AOKI (T) and KAKO (Y). Relation between micelle size and formation of soluble casein on heating concentrated milk. *J. Dairy Res.* 50(2); 1983; 207-13
- 236 LAMBELET (P). Comparison of N.M.R. and D.S.C. methods for determining solid content of fats application of milk fat and its fractions. *Food Sci. + Technol.* 16(2); 1983; 90-95
- 237 GRIFFITHS (MW). Synergistic effects of various lipases and phospholipase C on milk fat. *J. Food Technol.* 18(4); 1983; 495-505
- 238 DEETH (HC), FITZ-GERALD (CH) and SNOW (AJ). A gas chromatographic method for the quantitative determination of free fatty acids in milk and milk products. *NZ. J. Dairy Sci. Technol.* 18(1); 1983; 13-20
 A gas chromatographic method for determination of free fatty acids in milk, milkfat, butter, cheese and milk powder is described. A hexane-diethyl ether extract of the product is prepared in the presence of anhydrous sodium sulphate and passed through a column of neutral, deactivated alumina to separate fat. The free fatty acids retained on the alumina are eluted into a small volume of 6% formic acid in diisopropyl ether. An aliquot of this solution is chromatographed on the stationary phase SP-216-PS and all major fatty acids quantified. The method is simple and convenient and exhibits a high degree of repeatability. AA
- 239 Van SCHALM (KJ). Determination of traces of formaldehyde in milk as the 2,4-dinitrophenylhydrazone by HPLC. *Neth. Milk Dairy J.* 37(1/2); 1983; 59-64
 A reversed phase HPLC system with a Lichrosorb 10-RR-18 column and methanol/water mobile phase has been applied to the determination of formaldehyde in milk. Formaldehyde was steam-distilled from the acidified milk, converted to its 2,4-dinitrophenylhydrazone, extracted and concentrated. The residue in methanol was analysed by HPLC. Recovery tests have been carried out at levels of 0.05, 0.10 and 0.20 mg/kg (n=4). The mean recovery was $91 \pm 3.9\%$. The detection limit was 0.005 mg/kg. AA
- 240 BUSH (B), SNOW (JT) and CONNOR(S). High resolution gas chromatographic analysis of nonpolar chlorinated hydrocarbons in human milk. *J. Assoc. Off. Anal. Chem.* 66(2); 1983; 248-55

- 241 ASHOOR (SH) and MONTE (WC). High performance liquid chromatographic determination of *Bifidobacterium bifidum* growth factors in human milk. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 135-9
- The method involves gradual addition of 3 volumes of ethanol to the milk sample, filtration, and analysis of the growth factors in the filtrate by HPLC. It is simpler and requires less time than the present microbiological method. Moreover, it revealed for the first time the presence of two, separable growth factors in all the human milk samples that were tested. The HPLC method is sensitive and can be used to monitor the type and the amount of growth factors in mother's milk during lactation. KMD
- 242 THOROGOOD (SA), WOOD (PP) and PRENTICE (GA). An evaluation of the Charm Test - a rapid method for the detection of penicillin in milk. *J. Dairy Res.* 50(2); 1983; 185-91
- 243 MOATS (WA). Determination of penicillin G, penicillin V, and cloxacillin in milk by reversed-phase high-performance liquid chromatography. *J. Agric. Food Chem.* 31(4); 1983; 880-83
- 244 WOOLLARD (DC). An automated hydrazide method for the determination of lactose in milk products. *NZ. J. Dairy Sci. Technol.* 18(1); 1983; 69-76
- 245 BERNHAUER (H), BAUDNER (S) and GUNTHER (HO). Immunological detection of proteins of cow milk in sheep or goat milk and cheese with a specific immunoglobulin. *Z. Lebensmittel-Unters Forsch.* 177(1); 1983; 8-10 (German)
- 246 JOHNSTON (DE), MURPHY (RJ) and WHITTAKER (NR). Effects of thermization and cold storage on some properties of rennet-induced milk gels. *J. Dairy Res.* 50(2); 1983; 231-6
- The effects of thermization (a sub-pasteurization heat treatment), followed by cold storage at 7°C for up to 3 days on the post-gelation behaviour of rennet-induced gels from alternate-day collected milks, pasteurized before testing, were investigated. Observations of the time course of gel rigidity modulus development and of the syneresis of cut curds were fitted to a general exponential relationship to aid interpretation. Milk performance was assessed by measurements of rennet coagulation time at pH 6.5, various gel rigidity and syneresis parameters and losses of protein and Ca to the whey. A small but significant reduction in protein losses to the whey (mean 0.05%) was the only effect resulting from thermization. Cold storage gave rise to significantly weaker gels than those from unstored controls. The gels from cold-stored milks attained 50% of their maximum rigidity modulus in significantly less time and lost significantly more protein (mean 0.11%) to the whey. Samples cold stored for 1, 2 or 3 days were not significantly different from each other and no other parameters were affected. No significant interactions between thermization and cold storage were found. AA
- 247 PUIUSANI (SR) and RAO (DR). Whole body, liver and plasma cholesterol levels in rats fed *Thermophilus bulgaricus*, and acidophilus milk. *J. Food Sci.* 48(1); 1983; 280-81
- 248 SUBRAMANIAN (P) and SHANKAR (PA). A note on lactose fermenting yeasts in milk products. *J. Food Sci. Technol. (India)* 20(4); 1983; 181-3
- Milk products (cream, butter, dahi, and cheese-whey) were analysed for lactose and non-lactose fermenting yeasts. All the samples contained yeasts

and molds with counts of $40 - 12.8 \times 10^4$ cells/ml. Yeasts isolated from dahi and cheese whey were of lactose fermenting type. Of the 27 isolates, only 2 isolates from cream and 5 isolates from butter were lactose fermenting yeasts and they were identified as *Candida pseudotropicalis*. KAR

- 249 WESTON (RJ). Trace amounts of nitrosamines in powdered milk and milk proteins. *J. Sci. Food Agric.* 34(8); 1983; 893-5
Nitrosamines could be detected above $1 \mu\text{g}/\text{kg}$ in 5 samples of indirectly dried skim milk powders, 20 samples of directly-fried skim-milk powders and 10 samples of directly fried butter-milk powders. KAR

- 250 WOOLLARD (DC) and EDMISTON (AD). Stability of vitamins in fortified milk powders during a two-year storage period. *NZ. J. Dairy Sci. Technol.* 18(1); 1983; 21-6

Bulk packages (25 kg) of vitaminised whole milk powder were stored at ambient temperature and analysed at intervals over 24 months using HPLC techniques. Most of the vitamins studied namely thiamine, riboflavin, niacinamide, pyridoxine, ascorbic acid and α -tocopherol acetate survived the storage period without loss. However the retinyl esters (vitamin A) degraded substantially. KAR

KHOA

- 251 VARADARAJ (MC) and NAMUDRIPAD (VKN). Production of thermostable deoxyribonuclease and enterotoxins by *Staphylococcus aureus* in Khoa during storage. *J. Food Sci. Technol. (India)* 20(4); 1983; 179-81

The ability of 4 wild cultures (K-283, K-192, K-220 and A-100) of *Staphylococcus aureus* to produce thermostable deoxyribonuclease (TDNase and enterotoxins in Khoa having moisture levels of 26-28%, 38-42% and 45-48% and stored at 25-35 C and at 4-5 C was tested. All the test cultures stored at 25-35 C produced almost equal quantities of TDNase within a week, irrespective of the levels of moisture in the Khoa. Detectable levels ($2 \mu\text{g}$) of enterotoxin was produced by *S. aureus* during storage at 25-35 C; the wild cultures K-283 and K-192 and the standard culture A-100 produced their respective A,E and E enterotoxin. Except in K-220, moisture levels did not influence the production of enterotoxin. Samples stored at 4-5 C did not produce the toxin, except toxin B which was produced by K-220 in small quantities. KAR

CURD

- 252 JORDAN (PJ). A vertical vat for washing of casein curd. *NZ. J. Dairy Sci. Technol.* 18(1); 1983; 27-33

YOGHURT

- 253 SALJI (JP) and ISMAIL (AA). Effect of initial acidity of plain yoghurt on acidity changes during refrigerated storage. *J. Food Sci.* 48(1); 1983 258-9

in the actin-myosin interaction during postmortem storage of muscle. MVG

- 266 BAILEY (AJ). Changes in meat handling and quality. *IFST Proc.* 16(1); 1983; 16-21
Aspects covered include production, processing, and effect of changes on eating quality. KAR
- 267 PARRIS (N) and FOGLIA (TA). Simplified alcoholic extraction procedure for ammonia in meat tissue. *J. Agric. Food Chem.* 31(4); 1983; 887-9
A simplified alcoholic extraction procedure for isolating ammonia and volatile amines from tissue was developed; the procedure requires little sample preparation prior to analysis. Ammonia content of extracts was then determined enzymatically with glutamate dehydrogenase and ammonia plus volatile amines with an ammonia-selective electrode. The coefficient of variation was 2.5 and 2.0% for the enzyme and electrode methods, respectively. The apparent total volatile amine content, defined as the difference between the assays obtained by these two methods, was determined for fresh beef and chicken, processed ham, and frozen shrimp. Of the samples tested, processed ham contained the highest concentration of ammonia plus volatile amines, and shrimp had the highest ratio percentage of volatile amines to ammonia. AA
- 268 SUSHIL KUMAR, PANDEY (NK) and MAHAPATRA (CM). Added nitrite in cured meats. A review. *Indian Food Packer.* 37(2); 1983; 91-5
The review covers reaction products of nitrite and determination of fate of added nitrite. BSN
- 269 NARASIMHA RAO (D). *Salmonella* in meat. *J. Food Sci. Technol. (India).* 20(4); 1983; 156-60
200 mutton carcasses from Mysore city slaughter house (MCSH), 100 from retail shops (RS) and 100 from modern abattoir (MA) situated at CFTRI were examined for *Salmonella*. 9% of carcasses from MCSH and 8% from RS showed the presence of *Salmonella*, but none was detected in MA samples. Chopping blocks, knives and the rectal swabs from animals used in slaughter house were contaminated with *Salmonella*. The serotypes isolated included *S. gaminaru*, *S. adelaide*, *S. virchow*, *S. newport*, and *S. paratyphi* B. These were tested on mice, rabbits and guinea pigs and the extent of virulence was determined. The results indicate that *Salmonella* were more virulent to mice than to rabbits or guinea pigs. KAR
- 270 BECHTEL (PJ) and PARRISH (F). Jr. Effects of postmortem storage and temperature on muscle protein degradation: Analysis of SDS gel electrophoresis. *J. Food Sci.* 48(1); 1983; 294-5, 297
Proteolytic breakdown of the major bovine contractile proteins during postmortem storage of meat has been studied. It is revealed that substantial temperature-dependent degradation of the myosin heavy chain and other muscle proteins can occur during storage. MVG
- 271 LARSSON (BK), SAHLBERG (GP), ERIKSSON (AT) and BUSK (LA). Polycyclic aromatic hydrocarbons in grilled food. *J. Agric. Food Chem.* 31(4); 1983; 867-73
The levels of 22 polycyclic aromatic hydrocarbons (PAH) were determined in 63 samples of grilled meat and meat products by capillary gas chromatography. The results reveal that the PAH levels are strongly dependent

Detailed analyses during the manufacture of these cheeses revealed that the difference in flavour is due mainly to the activity of *Strep. faecalis*, *E. coli* and *Ps. fluorescens*, but no single organism is responsible for the afore-mentioned differences. KMD

- 260 SHAMSUZZAMAN (K) and HAARD (NF). Evaluation of harp seal gastric protease as a rennet substitute for cheddar cheese. *J. Food Sci.* 48(1); 1983; 179-82
- 261 SHAMS (MA) and JAYNES (HO). Characterization of exopolysaccharide produced by *Corynebacterium* 98 in cheese whey substrate. *J. Food Sci.* 48(1); 1983; 208-11
- 262 KORYCKA-DAHL (M), VASSAL (L), RIBADEAU-DUMAS (B) and MOCQUOT (G). Studies on lipid oxidation during ripening of camembert cheese and its impact on cheese flavour. *Sci. Aliment.* 3(1); 1983; 79-90
- 263 ABD EL-SALAM (ME), EL-SHIBINY (S), EL-KOUSSEY (LA) and HAGGAG (HF). Domiati cheese made with ultrafiltered reconstituted milk and lipolysed recombined cream. *J. Dairy Res.* 50(2); 1983; 237-40

A new method was developed for making Domiati cheese, based on blending ultrafiltered reconstituted milk and lipolysed recombined cream. The chemical composition of the new product was similar to the traditional cheese. The flavour intensity increased with the amount of lipase used in the cream hydrolysis. During storage the acidity and tyrosine content of cheese from different treatments increased at nearly similar rates. The level of total volatile fatty acids was affected by the level of lipase used. Organoleptic scoring showed that cheese made with cream treated with the intermediate levels of lipase (2 or 5 g/500 g cream) ranked the highest, after 1 and 4 months of storage respectively. AA

ICE CREAM

- 264 JULIEN (JP) and BEAUDOIN (A). Difficiency of some containers in protecting ice cream against photooxidation. *Sci. Aliment.* 3(1); 1983; 69-77 (French)

Commercial ice cream has been packed in materials allowing the passage of different levels of light energy, and stored at -15 C for 14 days. The effect of light on the photooxidation of ice cream has been measured by chemical tests (peroxide index, TBA test) and sensory evaluation. Ice cream packaged in transparent plastic was oxidized after one week exposure at 6,600 Lux. Oxidation was observed with commercial plastic container to a lesser extent. Opaque containers (carton and aluminium foil) with a light transmission of less than 3% have offered a good protection. AA

MEAT AND POULTRY

- 265 KANG (JO), ITO (T) and FUKAZAWA (T). Effect of electrical stimulation of postmortem property change of myofibrillar proteins. *J. Food Sci.* 48(1); 1983; 19-22,32

The study indicates that electrical stimulation inhibits the increase

in the actin-myosin interaction during postmortem storage of muscle. MVG

- 266 BAILEY (AJ). Changes in meat handling and quality. *IFST Proc.* 16(1); 1983; 16-21
Aspects covered include production, processing, and effect of changes on eating quality. KAR
- 267 PARRIS (N) and FOGLIA (TA). Simplified alcoholic extraction procedure for ammonia in meat tissue. *J. Agric. Food Chem.* 31(4); 1983; 887-9
A simplified alcoholic extraction procedure for isolating ammonia and volatile amines from tissue was developed; the procedure requires little sample preparation prior to analysis. Ammonia content of extracts was then determined enzymatically with glutamate dehydrogenase and ammonia plus volatile amines with an ammonia-selective electrode. The coefficient of variation was 2.5 and 2.0% for the enzyme and electrode methods, respectively. The apparent total volatile amine content, defined as the difference between the assays obtained by these two methods, was determined for fresh beef and chicken, processed ham, and frozen shrimp. Of the samples tested, processed ham contained the highest concentration of ammonia plus volatile amines, and shrimp had the highest ratio percentage of volatile amines to ammonia. AA
- 268 SUSHIL KUMAR, PANDEY (NK) and MAHAPATRA (CM). Added nitrite in cured meats. A review. *Indian Food Packer.* 37(2); 1983; 91-5
The review covers reaction products of nitrite and determination of fate of added nitrite. BSN
- 269 NARASIMHA RAO (D). *Salmonella* in meat. *J. Food Sci. Technol. (India).* 20(4); 1983; 156-60
200 mutton carcasses from Mysore city slaughter house (MCSH), 100 from retail shops (RS) and 100 from modern abattoir (MA) situated at CFTRI were examined for *Salmonella*. 9% of carcasses from MCSH and 8% from RS showed the presence of *Salmonella*, but none was detected in MA samples. Chopping blocks, knives and the rectal swabs from animals used in slaughter house were contaminated with *Salmonella*. The serotypes isolated included *S. gaminaru*, *S. adelaide*, *S. virchow*, *S. newport*, and *S. paratyphi* B. These were tested on mice, rabbits and guinea pigs and the extent of virulence was determined. The results indicate that *Salmonella* were more virulent to mice than to rabbits or guinea pigs. KAR
- 270 BECHTEL (PJ) and PARRISH (F). Jr. Effects of postmortem storage and temperature on muscle protein degradation: Analysis of SDS gel electrophoresis. *J. Food Sci.* 48(1); 1983; 294-5, 297
Proteolytic breakdown of the major bovine contractile proteins during postmortem storage of meat has been studied. It is revealed that substantial temperature-dependent degradation of the myosin heavy chain and other muscle proteins can occur during storage. MVG
- 271 LARSSON (BK), SAHLBERG (GP), ERIKSSON (AT) and BUSK (LA). Polycyclic aromatic hydrocarbons in grilled food. *J. Agric. Food Chem.* 31(4); 1983; 867-73
The levels of 22 polycyclic aromatic hydrocarbons (PAH) were determined in 63 samples of grilled meat and meat products by capillary gas chromatography. The results reveal that the PAH levels are strongly dependent

on the method of cooking and type of heat source used. The grilling of frankfurters in the flames of a log fire resulted in extremely high PAH levels, up to 212 $\mu\text{g/kg}$ benzo(a)pyrene (BaP). When the grilling was carried out over the embers, the average level of BaP was only 7.7 $\mu\text{g/kg}$. Relatively high PAH levels, an average of 17.6 μg of BaP/kg, were found in frankfurters grilled over smoldering spruce or pine cones. The BaP levels in charcoal-grilled frankfurters did not exceed 1 $\mu\text{g/kg}$, whereas charcoal-grilled whole meat samples contained 2.3-6.1 $\mu\text{g/kg}$. Frying or electric broiling of frankfurters did not lead to any appreciable increase of the original trace levels. Extracts from flame-grilled frankfurters were mutagenic to *Salmonella typhimurium* TA 100 after metabolic activation. AA

- 272 SKREDE (G). An enzymatic method for determination of starch in meat products. *Food Chem.* 11(3); 1983; 175-85
Starch is determined as glucose by an enzyme-hydrolytic method using thermo-stable α -amylase and amyloglucosidase for hydrolysis. The recovery in various cooked and uncooked sausages containing up to 12% starch ranged from 92 to 102% of the starch content estimated from the recipe. KAR
- 273 SKREDE (G). Enzymic starch-degrading ability of meat and blood plasma in products after processing. *Food Chem.* 12(1); 1983; 15-24
The study indicates the starch-degrading ability of beef and pork cuts intended as ingredients for sausage production. Beef sirloin and shoulder cuts were shown to contain enzymes capable of degrading starch. The activity corresponded to an increase in reducing equivalent of about 400-600 equivalent per 100 g fat free muscle per minute. In the commercial meat cuts the starch degrading activity of pork was higher than that of beef. In meat sausages maximum starch degradation during storage was obtained when samples were heated to 70 C. KAR
- 274 WALLINGFORD (LW) and LABUZA (TP). Evaluation of the water binding properties of food hydrocolloids by physical/chemical methods and in a low fat meat emulsion. *J. Food Sci.* 48(1); 1983; 1-5
Water-binding capacity (WBC) was measured in several macromolecular food grade hydrocolloids by using the Baumann capillary suction apparatus, the cryoscopic osmometer and moisture sorption isotherms. The values obtained varied among the three methods, though each method distinguished between ingredients of different WBCs. Significant correlation was obtained between the osmometer data and moisture sorption data at $a_w = 0.98$; neither method, however, correlated with data obtained by Baumann's method. The best prediction of hydrocolloid's relative WBC in a low fat meat emulsion food system was obtained by Baumann method as compared to the normal methods applied to meats. Xanthan gum was the best among the gums in respect of retention of added water. MVG
- 275 ISLAM (MN), SCHLITZER (JL) and ISLAM (NB). Effect of trans fatty acids on protein utilization and serum cholesterol. *J. Food Sci.* 48(1); 1983; 100-101
110
- 276 LEE (YB). A modified sample preparation method for measuring meat tenderness by the Kramer shear press. *J. Food Sci.* 48(1); 1983; 304-5
- 277 CALKINS (CR), BRANECKY (LJ), DUTSON (TR), SMITH (GC) and CARPENTER (ZL). Postmortem muscle metabolism and meat tenderness. *J. Food Sci.* 48(1); 1983; 23-5, 35

- 278 VERMA (MM), ADINARAYANAIAH (CL), SHARMA (NV), ASHOK KUMAR (BT), SAXENA (VB) and MATHEW (TV). Trace elements in some canned meat products. *J. Food Sci. Technol. (India)* 20(4); 1983; 153-4

26 types of meat products collected from various manufacturers in India were analysed for Cu, Zn, Sn, As and Pb. It was found that the mean contents (in ppm) were Cu < 18.0, Zn ≤ 35.0, Sn ≤ 191.0. All the meat products showed As and Pb in concentration < 2 and < 2.5 ppm respectively. KAR

- 279 NIELSEN (H-JS). Composition of bacterial flora in sliced vacuum packed bologna-type sausage as influenced by nitrite. *J. Food Technol.* 18(3); 1983; 371-85

The influence of the addition of 0, 100 and 200 ppm nitrite to sliced vacuum packed Bologna-type sausage was studied at 2, 5, 10 and 20 C. An increasing inhibition of growth of *Brochothrix thermosphacta* *Enterobacteriaceae* and *Moraxella*/*Moraxella*-like organisms was found with increasing nitrite concentration and/or decreasing temperature. The gram positive cocci, the yeasts and lactic acid bacteria were only inhibited to a limited extent. Consequently, the lactic acid bacteria became more dominant in vacuum packed cooked meat product with added nitrite. The gram negative bacteria often constitute the major flora in packages produced without nitrite, and many proliferate at higher temperatures even in samples produced with nitrite. AA

BEEF

- 280 SEIDEMAN (SC) and DURLAND (PR). Vacuum packaging of fresh beef: A review. *J. Food Quality.* 6(1); 1983; 29-47
- 281 HARTMAN (GJ), JIN (QZ), COLLINS (GJ), LEE (KN), HO (C-T) and CHANG (SS). Nitrogen-containing heterocyclic compounds identified in the volatile flavour constituents of roasted beef. *J. Agric. Food Chem.* 31(5); 1983; 1030-33
- 282 BARNES (WS), MAHER (JC) and WEISBURGER (JH). High-pressure liquid chromatographic method for the analysis of 2-amino-3-methylimidazol(4,5-f)quinoline, a mutagen formed during the cooking of food. *J. Agric. Food Chem.* 31(4); 1983; 883-6
- A quantitative method for the analysis of 2-amino-3-methylimidazol(4,5-f)quinoline (IQ), a mutagen formed during the cooking of beef and fish, has been developed. A crude extract containing basic materials is purified by preparative TLC and reverse-phase HPLC. Quantitation is done on a cyanopropyl bonded-phase column run in the reverse-phase mode. Recovery is about 45% and the limit of detection is less than 25 pmol/50 g of beef. Control experiments with spiked extracts show a high degree of precision. The method has been used to show that there are relatively large differences in the formation of IQ between meat samples with a high or low fat content. The presence of other additives such as BHA, Celite, and casein decreases the formation of mutagen during cooking. AA
- 283 GREER (GG). Psychrotropic *Brochothrix thermosphacta* bacteriophages isolated from beef. *Appl. Environ. Microbiol.* 46(1); 1983; 245-51

- 284 PURNOMO (H), BUCKLE (KA) and EDWARDS (RA). A preliminary study on a traditional intermediate moisture beef products. *J. Food Sci. Technol. (India)* 20(4); 1983; 177-9

Dendeng is a traditional Indonesian intermediate moisture (IM) beef product which incorporates coconut sugar, salt and spices. Present study reports the effect of coconut sugar (i) and salt on the moisture content (MC) and water activity (a_w) of Dendeng. The meat slices were soaked separately in (i) coconut sugar and salt, (ii) spices, and mixture of (i) and (ii) and dried at 35 C for 270 minutes and 70 C for 180 minutes. The results showed that the addition of coconut sugar and salt besides improving palatability and acceptability - lowered the MC and a_w of the products, while spices alone did affect MC or a_w rehydration for one week of meat slices at RH of 85-97% resulted in MC and a_w of 30-40% and 0.74 to 0.93 respectively, but rehydration at RH of 52-80% gave MC and a_w of 15-28% and 0.60 to 0.80 respectively. KAR

SHEEP

- 285 DANI (NP), MAHENDRAKAR (NS), RAJALAKSHMI (D) and DHANARAJ (S). Influence of electrical stunning on quality of mutton. *J. Food Sci. Technol. (India)*. 20(4); 1983; 165-8

Mutton quality obtained in electrically stunned (ES) Bannur rams was compared with the conventional method (CM) of slaughter. Lactic acid level in blood was significantly higher in ES sheep, the bleed out value per kg of live weight did not differ significantly in ES and CM meat. Glycogen level and water holding capacity of leg muscle in ES sheep was significantly lower than the control. Cooking loss did not show significant difference. Firmness, toughness, succulence, and overall quality and Warner - Bratzler shear values did not vary significantly between ES and CM. It is concluded that apart from creating a slight stress reaction, electrical stunning did not influence mutton quality significantly. KAR

- 286 RASHID (NH), HENRICKSON (RL), ASGHAR (A) and CLAYPOOL (PL). Evaluation of certain electrical parameters for stimulating lamb carcasses. *J. Food Sci.* 48(1); 1983; 10-14

Two voltages (50 and 350 V) and three frequencies (10, 100 and 250 Hz) were evaluated on lamb sides of twenty one animals. Electrical stimulation at both voltages accelerated postmortem glycolysis in *Longissimus dorsi* (LD) and *Semimembranosus* muscles. In *Semitendinosus* muscles, it resulted in less Ca^{++} -induced shortening than achieved by any combination of voltages and frequencies. The treatment also provided the greatest energy per pulse and gave fast and vigorous twitching of most muscles during stimulation. Results show that combinations of high voltage and low frequency were more effective in accelerating postmortem glycolysis than those with low voltage and high frequency. Any of the experimental treatments, however did not affect the solubility of different protein fraction in LD muscle. MVG

- 287 RASHID (NH), HENRICKSON (RL), ASGHAR (A) and CLAYPOOL (PL). Biochemical and quality characteristics of ovine muscles as affected by electrical stimulation, hot boning, and mode of chilling. *J. Food Sci.* 48(1); 1983; 136-40

Effects of electrical stimulation (within 15 hour postmortem at 350 V with 10 Hz) and slow chilling (14 ± 2 C for 5 hour postmortem) of lamb

carcasses on some biochemical and quality characteristics of some specific muscles were studied. There was significantly rapid pH decline in *longissimus dorsi* (LD) and muscles, less cold shortening in the *semitendinosus* (ST) muscle and greater tenderness in both LD and ST muscles than sides chilled at 2 C. No effect were evident on cooking losses of LD and ST muscles, lean colour of LD during a 4-day retail display, solubility of protein fractions and the swelling factor of the stroma protein of LD muscles. MVG

PORK

- 288 SWASDEE (RL), TERRELL (RN), DUTSON (TR), CRENWELGE (DD) and SMITH (GC). Processing properties of pork as affected by electrical stimulation, post-slaughter chilling and muscle group. *J. Food Sci.* 48(1); 1983; 150-51, 162
Left sides of 30 slaughtered pigs were electrically stimulated (ES); right sides were not stimulated (NES). Sides were placed in a conventional cooler (24 hours) or blast freezer (3 hours) or showered with a brine solution (15.8% salt, -5.6 C for 3 hours). Twenty-four hours post-mortem, picnic shoulders were removed, dissected into four muscle groups and determinations made for certain processing properties. ES decreased ($P < 0.05$) pH values for predominantly white muscles, increased ($P < 0.05$) juice loss during cooking for shank muscles and decreased ($P < 0.05$) percentages of salt soluble protein (SSP) for both predominantly red and shank muscles. Other muscle properties were not affected by ES. Rapid initial chilling did not affect ($P < 0.05$) processing properties of muscle groups. AA
- 289 HARMON (MC), YU (CL) and SWAMINATHAN (B). An evaluation of selective differential plating media for the isolation of *Yersinia enterocolitica* from experimentally inoculated fresh ground pork homogenate. *J. Food Sci.* 48(1); 1983; 6-9
Seven media were evaluated for their effectiveness in recovering eight serotypes, and cefsulodin-irgasan-novobiocin (CIN) agar was found to be the best. Bismuth sulphite agar, MacConkey, and MacConkey-Tween 80 agars were acceptable, while cellobiose-arginine-lysine, desoxycholate citrate and *Salmonella-Shigella* agars were least effective. MVG
- 290 KREIGER (RA), SNYDER (OP) and PFLUG (IJ). *Clostridium botulinum* ionizing radiation D-value determination using a micro food sample system. *J. Food Sci.* 48(1); 1983; 141-5
A miniaturized system for rapid and accurate irradiation D-value determinations was evaluated. The test units consisted of pork, ham or chicken substrates inoculated with a mixed suspension of *Clostridium botulinum* spores, sealed inside polypropylene cryotubes at vacuum levels of 250, 125 and 50 torr. Samples were irradiated with ^{60}Co gamma rays at -30 ± 10 C up to a dose of 1.8 Mrads. D-values were in close agreement with historical determination for the substrates and conditions tested. The D-value estimates encompass a standard error of 0.025 Mrad at $p < 0.05$. Replicate experiments conducted on different days demonstrated a high degree of reproducibility. AA
- 291 TERRELL (RN), QUINTANILLA (M), VANDERZANT (C) and GARDNER (FA). Effects of reduction or replacement of sodium chloride on growth of *Micrococcus*, *Moraxella* and *Lactobacillus* inoculated ground pork. *J. Food Sci.* 48(1); 1983; 122-4

Replacement of NaCl (50 or 100%) by KCl or MgCl₂ in ground pork inoculated with a *Moraxella*, *Micrococcus* or *Lactobacillus* species did not have any effect on the first two named bacteria. However, with *Lactobacillus*, 50% reduction of NaCl slightly increased the counts. MVG

- 292 BELL (RG) and GILL (CO). Amylolytic activity in cooked luncheon meat. *J. Food Technol.* 18(3); 1983; 295-300

Glucose accumulated in chub packed luncheon meat cooked at 66 C. Glucose was also released from pork starch slurries, but not similar slurries prepared with beef or mutton. The amylolytic activity of pork was not inactivated by heating at 60 C, and this thermostable activity appears to account for the accumulation of glucose in pasteurized chub packed luncheon meat stored under conditions that preclude bacterial growth. AA

- 293 REAGAN (JO), LIOU (FH), REYNOLDS (AE) and CARPENTER (JA). Effect of processing variables on the microbial, physical and sensory characteristics of pork sausage. *J. Food Sci.* 48(1); 1983; 146-9, 162

Effects of various processing used in the production of pork sausage on the microbial, texture and sensory parameters of the final product. Microbial number decreased with increased fat level and increased with reduction in particle size and storage time. Increasing levels of fat and storage time caused lighter surface colour and reduced redness. Higher degree of maceration gave higher cook yields, though with high fat levels (40 and 45%), the cook yields were lower. The sensory characteristics was affected most by length of storage. An optimal processing system was proposed based on the results of the slides. MVG

- 294 OBIOHA (WI), STAHR (HM) and KRAFT (AA). Effect of sodium nitrite on aflatoxin production in pork sausage at different temperatures and the effect of nitrite on growth of *Aspergillus parasiticus* in culture. *J. Agric. Food Chem.* 31(5); 1983; 1039-42

RABBIT

- 295 JOLLEY (PD), LOPES (RLT), DRANSFIELD (E) and PERRY (G). Rabbit meat for manufacturing: The effect of different post-slaughter cooling treatments. *J. Food Technol.* 18(4); 1983; 481-93

Covered and uncovered carcasses were cooled post-mortem by slow chilling (+12 C), rapid chilling (0 C) or rapid freezing (-30 C). There was little difference in effect on quality between slow chilling and rapid freezing. Rapid chilling produced the shortest sarcomere lengths in *Musculus longissimus dorsi*, and this is attributed to indirectly induced shortening. Rapid chilling reduced significantly the water holding capacity, increased the resistance to compression and extrusion of the raw comminutes, and reduced the shear stress of the heated fine comminute. AA

POULTRY

- 296 LILLARD (HS) and THOMSON (JE). Efficacy of hydrogen peroxide as a bactericide in poultry chiller water. *J. Food Sci.* 48(1); 1983; 125-6

Hydrogen peroxide (H₂O₂) as a bactericide in poultry chiller water reduced aerobic organisms by 95-99.5% with 6,600 ppm or higher H₂O₂, and

E. coli by 97-99.9% with 5,300 ppm or higher. Even higher concentrations were required for similar bacterial reductions on carcasses; aerobic organisms on carcasses were reduced by 94% with 11,000 ppm and *E. coli* were reduced by 80% with 12,000 ppm. However, the reaction of H_2O_2 with catalase from the blood resulted in a bleached and bloated carcass which would be commercially undesirable for fresh or frozen retail sales but may not be objectionable when used for debone meat. AA

CHICKEN

- 297 TURNER (GV), PHILLIPS (TD), HEIDELBAUGH (ND) and RUSSELL (LH). High pressure liquid chromatographic determination of zearalenone in chicken tissues. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 102-4
- 298 KESHRI (RC) and SHARMA (N). Preparation of Tandoori chicken. *Poult. Guide.* 20(6); 1983; 47-8
 Various steps in the preparation of tandoori chicken, the recipe; applying the recipe; baking/roasting and the cooping are described. KMD
- 299 KOUSHIK (GB), KOTHANDARAMAN (P), SETHUMADAVAN (V) and NARAHARI (D). Influence of polyphosphate treatments on the quality and shelf-life of indigenous ready-to-cook broilers. *J. Food Sci. Technol. (India)* 20(4); 1983; 160-62
 Ready-to-cook broiler carcasses were soaked in 6 and 12% sodium tripolyphosphate (STPP) solution for 3 hours and 1 hour respectively and evaluated for their qualities while soaking and after 10 days of freezing. Carcasses soaked in chilled water for 1 or 3 hours acted as controls. The pH, moisture content, water holding capacity of the meat, microbial load of the skin and the shear value of the breast muscle were determined. STPP significantly increased the muscle pH and improved the water holding capacity and shelf life by decreasing the microbial load. There was no change in moisture content of the meat. STPP treatment reduced the toughness of meat and improved juiciness and flavour. 6% STPP was better than 12% STPP. KAR
- 300 YOUNG (LL). Effect of stewing on purine content of broiler tissues. *J. Food Sci.* 48(1); 1983; 315-6
 The purine content of raw and stewed broiler tissues was evaluated. Stewed breast had slightly more adenine and stewed thigh had slightly more guanine than their raw counterparts. The analyses indicated that all of the purines were considerably higher in cooked skin than in raw skin. This observation seems to be the result of extraction of other nitrogenous components (possibly collagen) from the skin. Hypoxanthine was the only purine which was studied that was extracted from the tissues in large amounts. AA

TURKEY

- 301 GREGORY (JF), GOLDSTEIN (SL) and EDDS (GT). Metabolite distribution and rate of residue clearance in turkeys fed a diet containing aflatoxin B_1 . *Food Chem. Toxicol.* 21(4); 1983; 463-7
 The residue was determined in turkeys fed diet containing aflatoxin B_1

(500 ppb) for 18 days. Aflatoxin residue levels were 0.01-1.19 ng/g of liver and muscle tissue the principal ones being B₁ and M₁. Aflatoxicol and aflatoxin Q₁ were also detected. Conjugated aflatoxins constituted 55-91% of the total detected aflatoxins. Immediately after stopping the aflatoxin administration report clearance of aflatoxin residues was noticeable. JVS

EGG

- 302 MATSUDA (T), WATANABE (K) and NAKAMURA (R). Immunochemical and physical properties of peptic-digested ovomucoid. *J. Agric. Food Chem.* 31(5); 1983; 942-6
- 303 ASHOOR (SH), SEPERICK (GJ), MONTE (WC) and WELTY (J). HPLC determination of riboflavin in eggs and dairy products. *J. Food Sci.* 48(1); 1983; 92-94, 110

An isocratic HPLC method has been developed to determine riboflavin in eggs, whole milk, 2% fat milk, skim milk, dry milk, yoghurt, cottage cheese, and cheddar cheese. The developed method involves acidification, centrifugation, and quantification of riboflavin in the supernatant with HPLC. The HPLC system consisted of a μ Bondapak C₁₈ column, a solvent system of water-methanol-acetic acid (68:32:0.1 v/v), a flow rate of 1.0 ml/minute, and a UV detector. The method is simple, rapid, sensitive, and specific for riboflavin. Recoveries of more than 90% were obtained in all samples analyzed. AA

- 304 NAKAMURA (R) and MATSUDA (T). A new protein band appearing in the electrophoretic pattern of egg white heated at below 60 C. *J. Food Sci.* 48(1); 1983; 87-91

When egg white was heated to between 50 and 60 C, a new protein band appeared in its polyacrylamide gel electrophoretic pattern. The formation of the protein band in stored egg white was almost the same as that of fresh egg white. This protein band was shown to be induced by the interaction between macroglobulin and lysozyme during the egg white heating. The optimum temperature for its formation was between 54 C and 57 C. This band formation may be used as an indicator for heat treatment of egg white. AA

- 305 TANAKA (A), NOSE (N), MASAKI (H), KIKUCHI (Y) and IWASAKI (H). Gas-liquid chromatographic determination of trace amounts of nitrite in egg, egg white, and egg yolk. *J. Assoc. Off. Anal. Chem.* 66(2); 1983; 260-63

Egg is deproteinized by adding a mixture of ammonium thiocyanate, mercuric chloride, and zinc acetate, and centrifuged. Nitrite in the supernate is converted to tetrazolophthalazine by reaction with hydralazine in acidic solution and then determined by gas-liquid chromatography with an electron-capture detector (GLC-ECD) and a column of OV-225 on Chromosorb W(HP). Nitrite concentrations from 5 to 50 ng/ml are calculated from peak height; the detection limit is 3 ng/ml extract. Recoveries from eggs, egg whites, and egg yolks ranged from 91.7 to 98.0%. The mean nitrite concentration in 50 egg samples was 0.04 ppm (0.01-0.11 ppm) with a detection limit of 4 ng nitrite/g. KMD

- 306 MAHAPATRA (CM), PANDEY (NK) and VERMA (SS). Maintenance of egg quality during cold storage. *Poult. Guide.* 20(4); 1983; 51-5

Guide-lines have been provided for the collection, washing, oil treatment, packaging, and cold storage of eggs. KMD

- 307 SUSHIL KUMAR, MAHAPATRA, (CM), PANDEY (NK) and GOYAL (RC). Interrelationship between certain measures of shell quality in quail eggs (*Coturnix coturnix Japonica*). *J. Food Sci. Technol.* (India) 20(4); 1983; 162-5

The relationship between various parameters (egg weight, egg volume, specific gravity, shell weight, shell percent (weight/g) shape index) of egg shell quality has been studied in 476 quail eggs. Significant positive correlations were observed between specific gravity, shell thickness, shell weight and shell percent (weight/g). The third degree polynomial curve is a better fit than the linear multiple regression curve and should be used for the determination of any one of these factors. Among the different factors, shell thickness is the best single indicator of specific gravity and of shell quality. KAR

- 308 DESMUKH (DS), YADAV (MC) and SENGAR (OPS). Effect of egg weight on subsequent broiler traits in White Plymouth Rock and New Hampshire breeds. *Poult. Guide.* 20(4); 1983; 73-6

The effect of egg weight on fertility, hatchability, mortality and body weight was studied. Medium-sized eggs (50-55 g) had better fertility (87.45-91.50%) and hatchability (75.75-78.80%) than eggs of a larger or smaller size. Furthermore, chicks coming out of medium-sized eggs had a lower mortality and greater body weight at the age of 4, 8 and 10 weeks. KMD

SEAFOODS

- 309 NAMBU DIRY (DD) and VENUGOPAL (K). Liquid nitrogen in IQF food technology. *Seafood Export J.* 15(5); 1983; 13-4

A note on the possibilities of using IQF (instant quick freezing) technology in the frozen fish industry of India. During 1981, India exported about 7570 tons of IQF frog legs, lobster tails, cuttle fish, and squids. KMD

FISH

- 310 CONNELL (JJ). Trends in fish utilisation. *IFST Proc.* 16(1); 1983; 22-27

Changes that have occurred recently in fish industry in three aspects namely raw materials, nutrition and storage have been discussed. KAR

- 311 WILLIAMS (SK), MARTIN (R), BROWN (WL) and BACUS (JN). Moisture loss in tray-packed fresh fish during eight days storage at 2 C. *J. Food Sci.* 48(1); 1983; 168-71

Tray (plastic foam with absorbent pads and over wrapped) packed fresh fillets of Flounder (*Pogonias cromis*), Red Snapper (*Litjanus blackfordii*), Croaker (*Micropogon undulatus*) and Ocean Perch (*Sebastes marinus*) were studied for effects of moisture loss on storage at 2 C for 8 days. The percent drip for all fish increased during storage and gross and net weights decreased. The total moisture content for all fish except croaker

was virtually unchanged during storage. Increased trimethylamine-nitrogen concentration decreased acceptability. MVG

- 312 EMOKPAE (AO). Preliminary studies on the chemical and weight composition of some commercially important species of fish and shrimp caught in the Nigerian inshore waters. *J. Food Technol.* 18(3); 1983; 271-83

The paper mainly deals with the chemical composition of commercially important marine fish of Nigeria in relation to their nutritive values. The selection is restricted to those species which can readily be obtained by standard fishing techniques, and whose biological characteristics can be studied throughout the year. The paper also includes a study of the changes in the composition according to season of the year. In addition, the work was further extended to an investigation of the carcass composition (i.e. the percentage flesh, head, skin, tail, bones, liver and entrails). AA

- 313 WEINBERG (ZG). A comparison of the binding properties of fish flesh. *J. Food Technol.* 18(4); 1983; 441-51

Binding properties of loaves prepared from the flesh of ten fish species were evaluated on the basis of visual scores for binding and instrumental measurements of tensile strength. The volume of liquor released on cooking and its content of solids and proteins were measured. The only parameters that corresponded with the binding properties were the moisture and fat content of the raw materials. Fish flesh with high fat content (and low moisture content) did not bind well. Bluefish exhibited a big variability with regard to its binding properties, and this corresponded with its variability in fat and moisture content. AA

- 314 DAMODARAN (S) and KINSELLA (JE). Binding of carbonyls to fish actomyosin. *J. Agric. Food Chem.* 31(4); 1983; 856-9

The binding affinity and the binding capacity of actomyosin decreased as salt concentrations were increased. The addition of tripolyphosphate at 0.1% and elevated temperatures enhanced the binding affinity. Increasing the chain length of the carbonyl increased the binding affinity, suggesting that hydrophobic forces were involved in actomyosin-carbonyl interactions. AA

- 315 ELSON (CM), ACKMAN (RG) and CHATT (A). Determination of selenium, arsenic, iodine and bromine in fish, plant and mammalian oils by cyclic instrumental neutron activation analysis. *J. Am. Oil Chem. Soc.* 60(4); 1983; 829-32

- 316 CHAKRABARTI (R). A method of debittering fish protein hydrolysate. *J. Food Sci. Technol. (India)* 20(4); 1983; 154-6

Use of papain and bromelain in the preparation of fish protein hydrolysate imparts bitter taste. Ethyl alcohol was used to remove bitter peptides from enzyme hydrolysates. Alcohol to water ratio ranging from 200;70 to 600;70 was tried and it was found that higher the concentration of alcohol, lesser was the bitter fraction in the hydrolysate. The solvent could be reused after refining, followed by distillation. The N, α -amino N and proteose contents of less bitter fraction were determined and it was found that debittered fraction contains more proteoses and less of α -amino N than the bitter fraction. KAR

- 317 GOVINDAN (TK). Pickled fish products. *Seafood Export J.* 15(5); 1983; 21-6

Pickling has been suggested for preserving fish for 5-6 months. This is particularly suitable for preserving the meat of shell-fish like clams, mussels, oysters, and crabs. A recipe and process for preparing pickled fish has been reported. The product can be packed in glass bottles for long shelf-life, or more cheaply and for quicker consumption in pouches of 12 - μ polyester film laminated with 150-gauge, low density polyethylene. KMD

- 318 KELLEHER (SD) and ZALL (RR). Ethanol accumulations in muscle tissue as a chemical indicator of fish spoilage. *J. Food Biochem.* 7(2); 1983; 87-92

Ethanol concentration was shown to accumulate in post mortem muscle tissue of marine fish as storage time increased. Concentration of the alcohol was determined using a rapid, enzymatic procedure. A study was conducted under commercially simulated storage conditions comparing the effectiveness of ethanol in monitoring fish spoilage to three more common quality tests. The ethanol method was shown to be as effective as established organoleptic, chemical, and biological testing procedures when following fish flesh degradation. AA

- 319 LUNDSTROM (RC). Fish species identification by agarose gel isoelectric focusing: Collaborative study. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 123-7

A collaborative study was conducted to determine if samples of unknown fishes could be identified by comparison of the unknown sarcoplasmic protein pattern with a photograph of the protein patterns from authentic species. Unknown samples along with supplies and instructions for making pH 2.5-9.0 agarose isoelectric focussing gels. were sent to 14 collaborators. The 14 collaborators identified a total of 276 unknown samples with 84% accuracy. Eight collaborators identified 90% or more of the samples correctly. Two collaborators averaged 80-85% correct, while the remaining four could identify only 50-69% of the samples correctly. No one species was consistently misidentified; however, the method is not recommended for adoption in its present form. KMD

- 320 REINERT (KH), HUNTER (JV) and SABATINO (T). Dynamic heated headspace analyses of volatile organic compounds present in fish tissue samples. *J. Agric. Food Chem.* 31(5); 1983; 1057-60

An analytical procedure was developed for the determination of selected volatile organic compounds in fish and shellfish tissue samples. The method employs a dynamic heated headspace isolation technique with solvent desorption of an activated carbon adsorbent media. Separation and identification, using capillary column gas chromatography with a flame ionization detector, allowed the determination of recovery values for all the compounds investigated in this study. The method was evaluated to quantitate the tissue burdens of estuarine organisms, which are reported herein. AA

- 321 AFOLABI (OA), ADESULU (EA) and OKE (OL). Polynuclear aromatic hydrocarbons in some Nigerian preserved freshwater fish species. *J. Agric. Food Chem.* 31(5); 1983; 1083-90

- 322 LOUIE (HW). Determination of total mercury in fish: An improved method. *Analyst.* 108(1292); 1983; 1313-7

A simple method is described for the rapid digestion of fish for total mercury determination by cold-vapour atomic-absorption spectrophotometry at 253.7 nm. A significant departure from previous methods is the use of concentrated hydrochloric acid together with sulphuric and nitric acids in the open digestion of samples. The digestion of up to 3 g of fish at 85-100 C is completed within 30 minutes and good recoveries of mercury are obtained from NBS Albacore tuna and fish samples spiked with inorganic mercury. The detection limit is $0.01 \mu\text{g g}^{-1}$ of mercury. AA

- 323 LERKE (PA), PORCUNA (MN) and CHIN (HB). Screening test for histamine in fish. *J. Food Sci.* 48(1); 1983; 155-7

A rapid method using a two-step sequential enzyme system is described. Diamine oxidase first catalyses histamine breakdown with formation of H_2O_2 which is then detected by formation of crystal violet from the leuco base in the presence of peroxidase. The two reactions can be combined and peroxidase can be used to control the tightness of screening. Both raw and heat-processed fish can be screened by this method. MVG

- 324 CHAYOVAN (S), RAO (RM), LIUZZO (JA) and KHAN (MA). Chemical characterization and sensory evaluation of a dietary sodium-potassium fish sauce. *J. Agric. Food Chem.* 31(4); 1983; 859-63

Uneviscerated ground fish (flounder and trout with 1.6 and 9.2% fat, respectively) were fermented in a mixture of sodium and potassium salts in different fish to salt ratios. Desired ratios of these salts in the fermented fish sauce were obtained by mixing appropriate volumes of individual salt-based sauce. Chemical analyses included total and ammonia nitrogen, salt, pH, carbonyls, amines, and amino acids. In all sauce samples, micro-moles per litre concentrations of carbonyls such as butanal, octanal, 2,4-decadienal, 2-undecenal, tetradecanal, etc. and amines (mono-, di-, and trimethylamine) were obtained. Amino acids such as lysine, histidine, arginine, aspartic acid, threonine, etc. ranged in concentrations between 10^{-4} and 10^{-3} mmol/L of sauce. The pH of sauce made from flounder and trout ranged from 5.0 to 6.1 and 4.9 to 5.6, respectively. Sensory analyses indicated that a mixture of NaCl and KCl (NaCl:KCl = 50:50) could provide as replacement for NaCl generally used in fish sauce fermentation. AA

- 325 KNORR (D). Use of chitinous polymers in food. A challenge for food research and development. *Food Technol.* 38(1); 1984; 85-9; 92-7

A review of processing of chitin into chitosan, their nutritional, safety, and; functional properties, chitosan applications for biomass recovery from food processing wastes, use of chitin and chitosan for removing undesirable metals and future applications. JVS

- 326 POULTER (NH) and TREVINO (JE). Acceptability of a canned pate product based on some Gulf of California shrimp by-catch fish. *J. Food Technol.* 18(3); 1983; 361-70

A canned pate product has been developed using deboned minces prepared from five fish species commonly found in shrimp by-catch from the Gulf of California. This product was made to simulate similar products that are marketed in Mexico but which are based on meat. De-boned minces prepared from fish which had been eviscerated and cleaned in two different ways were used as the basic raw material for pate formulations. Acceptability trials were held in which panelists were asked to score for various organoleptic characters. These data were statistically evaluated and showed that the pates were all acceptable. However, some major differences in

quality existed particularly with respect to colour for those pates prepared from certain fish species. The effect on pate quality of using different formulations and methods of evisceration of fish was minimal. AA

- 327 SANTHANAKRISHNAN (G). A diversified product and its export potential from India. *Seafood Export J.* 15(2); 1983; 19-24

Elasmobranchs- of which sharks constitute the major fraction - account for a sizeable percentage of the Indian marine fish catch. Their resource potential; seasonal distribution; catching methods; present utilization; methods and market; product development and processing aspects have been covered. KMD

BONITO

- 328 MATTHEWS (AD). Muscle colour deterioration in iced and frozen stored bonito, yellowfin and skipjack tuna caught in Seychelles waters. *J. Food Technol.* 18(3); 1983; 387-92

The colour deterioration of muscle in iced and frozen stored bonito, yellowfin and skipjack tuna caught in Seychelles waters has been determined. Storage life on ice before noticeable browning occurred was 12-14 days for yellowfin tuna and 7 days for bonito and skipjack tuna. At cold storage temperatures above -30 C, colour deterioration was very rapid. A new procedure has been devised for preparing the water extract necessary for the analysis of the ratio of met- to oxy- and deoxyhaemoglobin. AA

SHARK

- 329 YOUNATHAN (MT), OON (JK) and YUSOF (RBM). Control of heat induced oxidative rancidity in refrigerated shark and mackerel. *J. Food Sci.* 48(1); 1983; 176-78

Effectiveness of onion juice and water extracts of onion peel in controlling oxidative rancidity in heated shark and mackerel was studied. A 2% yellow onion peel hot water extract was most effective in tissues of both fish as determined by TBA test. Fatty acid analysis showed that both tissues contained oleic acid and mackerel contained a higher percentages of palmitic acid and decosahexaenoic acid than shark. MVG

HERRING

- 330 SLABYJ (BM) and HULTIN (HO). Microsomal lipid peroxidation system from herring light and dark muscle: Effect of cytosolic factors. *J. Food Biochem.* 7(2); 1983; 105-12
- 331 MUSIAL (CJ) and UTHE (JF). Interlaboratory calibration results of polychlorinated biphenyl analyses in herring. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 22-31

SALMON

- 332 HOLLINGWORTH (TA) Jr. and THROM (HR). A headspace gas chromatographic method for the rapid analysis of ethanol in canned salmon. *J. Food Sci.* 48(1); 1983; 290-91

A simple method is described for the rapid digestion of fish for total mercury determination by cold-vapour atomic-absorption spectrophotometry at 253.7 nm. A significant departure from previous methods is the use of concentrated hydrochloric acid together with sulphuric and nitric acids in the open digestion of samples. The digestion of up to 3 g of fish at 85-100 C is completed within 30 minutes and good recoveries of mercury are obtained from NBS Albacore tuna and fish samples spiked with inorganic mercury. The detection limit is $0.01 \mu\text{g g}^{-1}$ of mercury. AA

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- 338 SULLIVAN (JJ) and IWAOKA (WT). High pressure liquid chromatographic determination of toxins associated with paralytic shellfish poisoning. *J. Assoc. Off. Anal. Chem.* 66(2); 1983; 297-303

The method is applicable to saxitoxin, neosaxitoxin, gonyautoxins I to IV, and their sulphocarbamoyl derivatives. Toxins are separated on a bonded phase cyano column, and detected by fluorescence, following alkaline oxidation (NH_4^+ and periodic acid). The utility of this HPLC procedure for research and monitoring has been discussed. KMD

SHRIMP

- 339 JOHNSTON (JJ), GHANBARI (HA), WHEELER (WB) and KIRK (JR). Characterization of shrimp lipids. *J. Food Sci.* 48(1); 1983; 33-5

The distribution of fatty acids containing 9 or more carbons with respect to the various lipid subclasses were ascertained in edible shrimp (*Panaceus aztecus*) using column chromatography, enzymatic hydrolysis and an improved gas chromatography procedure. The subclasses were also quantified by gravimetry. The present study expands on the published literature which was concerned only with total fatty acid profiles containing 14 or more carbon atoms. MVG

- 340 AHAMAD (IH), RAO (RM), LIUZZO (JA) and KHAN (MA). Comparison of nutrients in raw, commercially breaded and hand-breaded shrimp. *J. Food Sci.* 48(1); 1983; 307-8

Wide differences in nutritional values were evident among the commercially breaded shrimp as compared to hand-breaded laboratory samples. Factors influencing the nutritional composition were breeding ingredients, breeding methods, shrimp species and handling and processing techniques of raw shrimp. MVG

FROG

- 341 SANTHANAKRISHNAN (G). Indonesian style of packing and packaging - an innovation in packing froglegs for exports from India. *Seafood Export J.* 15(4); 1983; 23-8

An attempt has been made to standardize the packaging of froglegs using polythene paper sheets. Fifteen trials were carried out. For packing froglegs of small grades, polythene paper of 150-200 gauge thickness is sufficient, where as 200-250 gauge thickness are needed if the legs are large. This type of packing occupies only 2% more space in the freezer, but is preferred by the wholesalers and retailers in Europe. KMD

PROTEIN FOODS

- 342 MORCOS (SR) and GABRIAL (GN). Protein-rich food mixtures for feeding the young in Egypt - II. Chemical and biological evaluation. *Qualitas Plantarum.* 32(1); 1983; 75-81

Ten protein-rich baby food mixtures based on popular dishes were formulated mainly from vegetable sources. Such mixtures could be easily prepared

at home from locally-produced crops available in markets at low prices. The nutritional studies undertaken on such mixtures, showed that they are rich in protein (17.7=23.2 g/100g). They contain all the essential amino acids. Biological studies indicated that they are of high biological value and that they could be safely given to children. The costs of such food mixtures are within the reach of most Egyptians. AA

- 343 REBER (EF), EBOH (L), ALADESELU (A), BROWN (WA) and MARSHALL (DD). Development of high-protein low-cost Nigerian foods. *J. Food Sci.* 48(1); 1983; 217-9

Three Nigerian foods, akara, chin-chin and puff-puff were supplemented with full fat cottonseed, defatted cottonseed, peanut, sesame or soyabean flours and were evaluated by African and non-African panels using nine-point Hedonic scale. The characteristics evaluated were appearance, texture, absence of greasiness, palatability and overall acceptability. African panel rated the foods significantly ($P = 0.001$) higher than the non-African panel. Supplementation with full-fat cottonseed, defatted cottonseed and defatted peanut flours gave good protein quality values. MVG

FRUIT JUICES AND BEVERAGES

- 344 KRISHNA PRASAD (CA), VEERABHADRA RAO (M), NAGARAJA (KV) and KAPUR (OP). Beverages and confectionery: Thin layer chromatographic separation and identification of water soluble green and blue coal-tar colours. *Indian Food Packer.* 37(2); 1983; 74-7

A new method for the separation of green and blue coal-tar food colours (Green S, Fast Green FCF, Brilliant Blue FCF, Indigocaramine and Blue VRS) has been developed by using starch and metal ion impregnation TLC. TLC plates impregnated with starch (1.25% w/w on silica gel basis), cadmium chloride (5% w/w on silica gel basis), nickel sulphate (5% w/w on silica gel basis) separately, using a solvent system phenol; water (80:20) gave a good separation of coal-tar food colours, particularly Green S and Brilliant Blue FCF which are found difficult to be separated using normal chromatographic techniques. BSN

- 345 COELHO (RG) and NELSON (DL). Rapid extraction and gas-liquid chromatographic separation of benzoic and sorbic acids in beverages. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 209-11

Sorbic and benzoic acids in carbonated drinks and fruit juices can be determined rapidly by this method. Acidified sample aliquots are transferred on to an Extrelut column. The acid preservatives are then eluted from the column with a mixture of ethyl ether and petroleum ether. The content of preservatives in the concentrated ethereal extract is then readily determined by temperature-programmed, gas-liquid chromatography without the need to prepare derivatives. KMD

FRUIT JUICES

- 346 RINGLAND (C) and ESCHENBRUCH (R). Gelatine for juice and wine fining. *Food Technol. NZ.* 18(8); 1983; 40-41.

ORANGE JUICE

- 347 HASEGAWA (S), PELTON (VA) and BENNETT (RD). Metabolism of limonoids by *Arthrobacter globiformis* II: Basis for a practical means of reducing the limonin content of orange juice by immobilized cells. *J. Agric. Food Chem.* 31(5); 1983; 1002-4

Arthrobacter globiformis II, a newly isolated bacterium from soil, metabolized bitter limonin of citrus juice to a nonbitter metabolite, limonol, when the juice was treated on a column packed with immobilized cells. On the basis of this information, a biological process that uses immobilized cells of this bacterium in acrylamide gel was developed for reduction of the limonin bitterness of citrus juice sera. The activity and operational stability of the process were demonstrated. AA

APPLE JUICE

- 348 GIMENO (A) and MARTINS (ML). Rapid, thin-layer chromatographic determination of patulin, citrinin, and aflatoxin in apples and pears, and their juices and jams. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 85-91

The mycotoxins are extracted with a mixture of acetonitrile and 4% aqueous KCl (9+1). The extract is cleaned up with water and then acidified; the toxins are recovered with chloroform and separated by TLC. Identification is made with the help of various developing solvents, spray reagents, and chemical reactions, and then a quantitative estimate is made by the limit of detection method. The minimum detectable concentrations of the mycotoxins are: patulin, 120-130 µg/kg; citrinin, 30-40 µg/kg; aflatoxin B₁ or G₁, 2-2.8 µg/kg; and aflatoxin B₂ or G₂, 2 µg/kg. KMD

- 349 POLL (L). The influence of apple variety on sensory quality of heated apple juices. *Food Sci. + Technol.* 16(2); 1983; 119-21

Apple juice was heated at 96 C for 20 minutes, 40 minutes and 1 hour. The samples heated for just 20 minutes did not suffer any loss of aroma nor did they develop a cooked aroma, while the samples heated for 40 minutes and 1 hour respectively, did suffer an aroma loss, and develop a cooked aroma. Pasteurized juices showed a large variation in aroma quality. Several chemical parameters were correlated with the aroma scores, but only one relationship - nitrogen content versus cooked aroma - was significant at the 95% level. It is recommended that juices from apple varieties of high sensory value - e.g. McIntosh, Spartan, Boskoop, Mutzu, and Golden Delicious - should be heated as little as possible. KMD

LITCHI

- 350 VIJAY SETHI and ANAND (JC). Prepare litchi squash at home. *Indian Hortic.* 28(1); 1983; 27

Fully ripe litchi (*Litchi chinensis* Sonn.) fruits were peeled, blended and the juice filtered. The juice was heated to 80-85 C after adding 1% citric acid (10 g/l), cooled immediately and preserved by adding potassium metabisulphite (1 g/l of juice). The juice could be used to make squash by mixing sugar syrup containing citric acid (8 g/kg) and a small quantity (1 g) of metabisulphite solution and adding a little rose essence before bottling. The squash could be served after diluting with three times of water. MVG

ALCOHOLIC BEVERAGES

- 351 LEHTONEN (M). Gas-liquid chromatographic determination of volatile phenols in matured, distilled, alcoholic beverages. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 62-70

Volatile phenols in matured spirits were determined by gas-liquid chromatography as their 2,4-dinitrophenyl derivatives. Phenol, o-cresol, m-cresol, p-cresol, guaiacol, p-ethyl phenol, p-ethylguaiacol, eugenol, and p-(n-propyl) guaiacol - which occurs only in dark rum - were studied at concentrations ranging from 0 to 2 ppm, depending on the phenol and the beverage. Scotch, Spanish, and Japanese whiskies - unlike other whiskies - contained o-, m-, and p-cresols. Cresols occur in whiskies because of the raw materials used, in particular peated malt. The level of p-ethylguaiacol is usually somewhat higher in cognac and other brandies than in whiskies. Dark rums differ from the other spirits in that they contain p-(n-propyl) guaiacol and, typically, higher levels of p-ethylphenol, p-ethyl guaiacol, and eugenol. These phenols also occur in higher quantities in some white rums than in whiskies and brandies. Two discriminant functions obtained by discriminant analysis did not permit an adequate classification of the spirits: only 82% of the whiskies, 57% of the brandies, and 50% of the rums could be classified correctly. KMD

- 352 LEHTONEN (M). High performance liquid chromatographic determination of non-volatile phenolic compounds in matured, distilled, alcoholic, beverages. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 71-78

Gallic acid, vanillic acid, syringic acid, vanillin, syringaldehyde, and ferulic acid in matured spirits were determined by reverse phase HPLC. Concentrations varied from 0 to 11 ppm, depending on the compound and the beverage. Gallic acid and syringaldehyde were the main components. Vanillic acid, vanillin, and, especially, gallic acid were the most important in distinguishing the different classes of spirit. Discriminate analysis gave 2 factors, which, however, could not be used to classify the samples with any great confidence: only 61% of the whiskies, 33% of the rums, and 52% of the brandies were correctly assigned in this way. KMD

WINE

- 353 BORSZEKI (J), KOLTAY (L), INCZEDY (J) and GEGUS (E). On the chemical composition of wines from particular wine regions and classification to specific regions based on results of the analysis. *Z. Lebensmittel Unters. Forsch.* 177(1); 1983; 15-8 (German)

Chemical composition of a wine sample of 250 ml, run through a column filled with a cellulose ion exchanger, was determined using an emission spectrographic method. From the 15 elements detected in the spectra, 13 elements (Fe, Mg, Cr, P, B, Mn, Pb, Ni, Al, Ag, Ti, Co, Zn) were accurately measurable. The analysis results were processed by using a pattern recognition method, and the wines of the same variety originating from three different wine regions could be classified corresponding to the wine regions. AA

- 354 ALMY (J), OUGH (CS) and CROWELL (EA). Identification of two new volatile amines in wine. *J. Agric. Food Chem.* 31(4); 1983; 911-3

Two amines, 1-pyrroline and 4,5-dimethyl-1, 3-dioxolane-2-propanamine, were identified in wine. This was accomplished by comparison of retention times and mass spectra of trifluoroacetamide (TFA) derivatives of the wine components with those of synthetic TFA derivatives. AA

- 355 REMEUF (F), DORANGE (JL) and DUPUY (P). Reduction of the mutagenic properties of red wine during aging. *Sci. Aliment.* 3(1); 1983; 137-46 (French)

The red wines have mutagenic properties detected by AMES test using *S. typhimurium* TA 98. Mutagenicity decreases during aging. The white wines are not mutagenic. The components of the wood which diffuse from the barrel into the wine during aging are not mutagens. The chemicals likely to be responsible for this property are flavonols. They disappear during aging, owing to their combination with anthocyanins. AA

BEER

- 356 WESTON (RJ). N-nitrosamine content of New Zealand beer and malted barley. *J. Sci. Food Agric.* 34(9); 1983; 1005-10

The levels of N-nitrosodimethylamine in 16 New Zealand beers and one Australian beer ranged from 0.2-1.8 $\mu\text{g dm}^{-3}$ with a mean of 0.76 $\mu\text{g dm}^{-3}$. KAR

- 357 SEN (NP), TESSIER (L) and SEAMAN (SW). Determination of N-nitrosoproline and N-nitrososarcosine in malt and beer. *J. Agric. Food Chem.* 31(5); 1983; 1033-6

- 358 TRESSI (R), ENGEL (K-H), KOSSA (M) and KOPPLER (H). Characterization of tricyclic sesquiterpenes in hop (*Humulus lupulus*, Var. Hersbrucker Spat). *J. Agric. Food Chem.* 31(4); 1983; 892-7

MALT

- 359 HAYNES (J). Malt products and their uses in baking. *Baking Today.* 4(2); 1983; 26-8

Discusses: malt manufacture; use of malt products in baking as malt extract, brown bread improver, light dried malt extract, dried malt extract; dark dried malt extract, high diastatic malt flour, malt flour, low diastatic full flavour malt flour; brown bread malt flour, crystal malt flour, flaked products and mixes. BSN

OILS AND FATS

OILS

- 360 RAMANNA (BR) and SEN (DP). Influence of water on the changes during heating of oils. *J. Food Sci. Technol.* (India) 20(4); 1983; 146-9

Coconut oil (iodine value 8.5) and niger seed oil (iodine value 126) were heated to 180 C with and without the addition of water. Samples of heated oil collected at 3, 16, 12, 18 and 24 hours of heating were analysed for epoxy acid, hydroxyl value, oxidised fatty acids, refractive index, free

fatty acid, iodine value, peroxide value, smoke point, and foaming height. On heating the water with added oils, the epoxy acid increased rapidly in the initial stages, development of oxidized fatty acids was slightly inhibited, peroxide value did not vary much, a slightly more decrease in smoke point and increase in fatty acids was noted. The presence of water in the oils made some difference in the extent of deterioration with respect to some parameters. The extent of unsaturation of an oil has no effect on the degree of deterioration on heating to frying temperature. KAR

- 361 MEERA VASWANI, MAHAJAN (PM), SETIA (RC) and BHIDE (NK). A simple colorimetric method for estimation of tricresyl phosphate in edible oils. *J. Oil. Technol. Assoc. (India)* 15(1); 1983; 12-3

The method is based on the measurement of blue colour obtained by the reaction of the phenol with 2,6-dichlorobenzoquinone chlorimide. The detection limit is 0.05%. KMD

- 362 DZIEDZIC (SZ) and HUDSON (BJF). Hydroxy isoflavones as antioxidants for edible oils. *Food Chem.* 11(3); 1983; 161-6

The antioxidant properties of some naturally occurring mono-, di- and tri-hydroxy isoflavones have been evaluated. Determination of induction periods in land at 100 C showed that genistein and prunetin were active, and 4,6,7-trihydroxyisoflavone marginally so, but the other isoflavones were inactive. A pigenin, the flavonol analogue of genistein, was inactive, but the activity of the other flavone examined, lutcolin was marked. KAR

- 363 HIRAYAMA (T), YAMADA (N), NOHARA (M) and FUKUI (S). High performance liquid chromatographic determination of malondialdehyde in vegetable oils. *J. Assoc. Off. Anal. Chem.* 66(2); 1983; 304-8

Malondialdehyde (MDA) was reacted with dansyl hydrazine, in an acidic medium, and the product, 4-dansyl-pyrazole, was determined by HPLC, using a Zorbax sil column with mixed mobile phase of n-hexane/methylene chloride. MDA can be determined as 1-dansyl-pyrazole by fluorometric detection at a level of 0.01 ppm in vegetable oils. KMD

- 364 AHMAD (MM), AL-HAKIM (S) and SHEHATA (AAY). The anti-oxidant activity of aminoacids in two vegetable oils. *J. Am. Oil Chem. Soc.* 60(4); 1983; 837-40

Most of the 27 aminoacids studied manifested some antioxidant activity, when added as an aqueous solution to either safflower oil, or a mixture of sunflower and cottonseed oil. Cysteine-HCl, glutamic acid-HCl (in the oil mixture), and glutamic acid-HCl (in safflower oil) behaved as pro-oxidants. When added in solid form, most amino acids were ineffective. The protection factors of the amino acids were usually low (≤ 1.3). The higher value of 1.85 was obtained, when lysine, arginine, glutamic acid, methionine, and hydroxyproline were added to the oil mixture (which is known to have a higher metal content). Chelation of the metals by the amino acids may be responsible for this higher protective effect. An increase in cysteine concentration up to 1.0% more than doubled the protection factor in Bint oil (compared with the 0.01% level), whereas with other amino acids the increase was either small or slight. KMD

COTTONSEED OIL

- 365 BURRIS (N). Three-, six- and nine-carbon ozonolysis products from cottonseed oil and crude chlorella lipids. *J. Am. Oil Chem. Soc.* 60(4); 1983; 806-11

LIME SEED OIL

- 366 PRASADA RAO (R), ATCHYUTA RAMAYYA (D), AZEEMODDIN (G) and THIRUMALA RAO (SD). Pilot plant processing of lime seed. *J. Oil Technol. Assoc. (India)* 15(1); 1983; 8-9

Lime seeds - which contain 38.4% oil - were processed in a pilot plant by crushing the whole seed, or flaked whole seeds, or the meats containing 5% of seed hulls; the oil yields were 29.3, 29.3, and 27% respectively. The oil has an iodine value of 102, and a saponification value of 197. The crude oil is brownish yellow in colour, and fugitive green; it tastes bitter and has an odour reminiscent of the original fruit, but is easily refined and bleached. KMD

MUSTARD OIL

- 367 GAMBHIR (PN), CHANDRA (S) and TIWARI (PN). Stage of harvesting for optimum oil yield in Indian mustard varieties. *Indian J. Agric. Sci.* 53(2); 1983; 115-7

6 varieties of Indian mustard (*Brassica juncea* (Linn.) Czern. & Coss. subsp. *juncea* Linn) were harvested at 4 maturity stages when pods were greenish-yellow, yellow, yellowish-brown and brown. The oil yield, which is the product of oil percentage and 1000-seed weight was highest at the yellowish-brown stage and did not decline after this stage. MVG

OLIVE OIL

- 368 LETUTOUR (B), TANTAOUI-ELARAKI (A) and IHLAL (L). Simultaneous detection of aflatoxin B₁ and ochratoxin A in olive oil. *J. Am. Oil Chem. Soc.* 60(4); 1983; 835-7

A screening method has been developed for simultaneous determination of aflatoxin B₁ and ochratoxin A in olive oil. The technique includes extraction of both mycotoxins with aqueous methanol, clean-up using lead acetate, partitioning in chloroform, and thin layer chromatography. The detection limits achieved are, respectively; 4 µg aflatoxin B₁ and 40 µg ochratoxin A/kg. 60 samples of crude farm olive oil were analyzed using this method; three of them contained traces of ochratoxin A while none was contaminated with aflatoxin B₁. AA

SESAME OIL

- 369 BANDYOPADHYAY (TS), CHAKRABARTI (J), GUHA (KC) and ROY (BR). Rapid detection of sesame oil in coloured fatty foods. *J. Food Sci. Technol. (India)*. 20(4); 1983; 175-6

A rapid method for detection of sesame oil in coloured fatty foods has

been developed. It consists of extraction of coloured oil from foods by acetone and acetonitrile mixture, cleaning up of extractants by passing through a column of activated charcoal and silanized glass wool layer and finally subjecting to modified 'Baudonin' test with concentrated eleuants, This method can detect 10 mg of sesame oil/gram of sample. AA

SOYABEAN OIL

- 370 HENSARLING (TP) and JACKS (TJ). Solvent extraction of lipids from soyabeans with acidic hexane. *J. Am. Oil Chem. Soc.* 60(4); 1983; 783-4
Hexane and hexane containing 5% acetic acid (v/v) were used to extract lipids from soyabeans, at room temperature and at 60 C. The hexane/acid mixture yielded about 11% more of total lipids and about 6-10% more of neutral oil than hexane alone. Extraction with hexane/acid at room temperature yielded the same or slightly greater amount of neutral oil than hexane alone at 60 C. The hexane/acid mixture extracted 35 times more phosphorus than hexane; this phosphorus represented 46% of the phospholipid P of soyabean. Moreover, separation of miscella from mere by filtration was twice as rapid when the hexane/acid mixture was used, as when hexane alone was used. KMD
- 371 LO (YC) and HANDEL (AP). Physical and chemical properties of randomly interesterified blends of soyabean oil and tallow for use as margarine oils. *J. Am. Oil Chem. Soc.* 60(4); 1983; 815-8
- 372 MIN (DB) and SCHWEIZER (D). Gas chromatographic determination of butylated hydroxyanisole, butylated hydroxytoluene and tertiarybutyl hydroquinone in soyabean oil. *J. Food Sci.* 48(1); 1983; 73-4
The new GC method involves isolation of antioxidants by nitrogen gas purging, collection on Tenax GC coated with polymetaphenoxylene, and separation and quantification by GC. The advantage of the method is that it needs neither extraction of antioxidants from oil nor their derivatisation. The method is highly sensitive and can determine as little as 10 ppm of BHA, BHT or TBHQ in oils in an hour. MVG
- 373 BAKER (EC) and BROWN (RL). A coalescer for soyabean oil emulsions. *J. Am. Oil Chem. Soc.* 60(4); 1983; 851
A simple device was designed, consisting of alternate layers of absorbant cotton supported on fiberglass that accelerated the coalescence of oil droplets from an emulsion of soyabean oil in aqueous isopropyl alcohol. Separation was generally complete in 90 minutes or less. AA
- 374 JAWAD (IM), KOCHHAR (SP) and HUDSON (BJF). Quality characteristics of physically refined soyabean oil: Effects of pretreatment and processing time and temperature. *J. Food Technol.* 18(3); 1983; 353-60
Conventional alkali refining of edible oils is being replaced progressively by physical refining, which offers improved yields, reduced processing times and few by-product problems. The variables involved in physical refining - pre-treatment, processing time and processing temperature - have been studied on a laboratory scale for the refining of soyabean oil, and results are obtained with phosphoric acid degummed, partially bleached oil processed at up to 250 C for not more than 2 hours. Higher temperatures and

longer times lead to quality defects such as loss of stability, increased viscosity, darkening and chemical changes reflected in reduction of iodine value and increase in free fatty acids. AA

SALFAT

- 375 BHATTACHARYYA (DK) and BANERJEE (K). Modification of sal fat (*Shorea robusta*) and mowrah fat (*Madhuca latifolia*) by methyl ester-triglyceride interchange reactions. *J. Am. Oil Chem. Soc.* 60(4); 1983; 841-5

Methyl ester-triglyceride interchange reactions provide a convenient route for preparing palmitic and lauric acid-rich sal fat, and stearic and palmitic acid-rich Mowrah fat, with altered triglyceride compositions and thermal properties. The products are new kinds of plastic fats and may be useful as extenders of cocoa butter, high stability bakery fat, vanaspati (unhydrogenated type), tropical margarine, etc. AA

FATS

- 376 MADISON (BL) and HUGHES (WJ). Improved lipxygenase method for measuring *cis*, *cis*-methylene interrupted polyunsaturated fatty acids in fats and oils. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 81-4
- 377 FARAG (RS), KHALIL (FA), SALEM (H) and ALI (LHM). Effects of various carbon and nitrogen sources on fungal lipid production. *J. Am. Oil Chem. Soc.* 60(4); 1983; 795-800

SIMAROUBA GLAUCA FAT

- 378 RAO (KVSA) and LAKSHMINARAYANA (G). Characteristics and composition of *Simarouba glauca* D.C. seeds and fat. *J. Food Sci. Technol. (India)* 20(4); 1983; 176-7

The seed fat of *Simarouba glauca* D.C. is edible and is used as a substitute for cocoa butter after fractionation. The characteristics of the seed and the fatty acid composition of the seed oil is comparable to those grown in other countries. The seed contains 60.3% fat with iodine value of 52.6 and saponification value of 190.5. The fatty acid composition (mol.%) is palmitic, 12.6, stearic 30.4, oleic 52.1, linoleic, 1.9; linolenic, 1.3, and arachidic, 1.7. KAR

SPICES AND CONDIMENTS

GARLIC

- 379 KAMANNA (VS) and CHANDRASEKHARA (N). Biochemical and physiological effects of garlic (*Allium sativum* Linn.). *J. Sci. Ind. Res.* 42(6); 1983; 353-7

This paper reviews aspects like effects of garlic on enzyme activity; hypoglycerine hypocholesteremic activity; blood coagulation and fibrinolytic activity etc. and points out the various lacunae in pulling it to optimum use in therapeutics. Certain characteristics like the ability of methyl

allyl trisulphide, a minor component of garlic oil, to prevent platelet aggregation in vitro, and its potential to lead to studies on its effect on prostaglandins have also been discussed. Many other effects of garlic which need detailed investigations have also been indicated. MVG

PAPRIKA

- 380 WOODBURY (JE). Reliability of analyses for indigenous insect fragments in ground paprika. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 79-80
 Variations in cleanliness (light filth) determinations within and between laboratories, for paprikas with indigenous insect fragments was significantly greater than previously reported for paprika with spiked insect fragments. KMD

PEPPERMINT

- 381 INMAN (RD), KIIGEMAGI (U) and DEINZER (ML). Determination of carbofuran and 3-hydroxycarbofuran residues in peppermint hay and peppermint oil. *J. Agric. Food Chem.* 31(4); 1983; 918-9

SENSORY EVALUATION

- 382 SIDEL (JL) and STONE (H). An introduction to optimisation research. *Food Technol.* 37(11); 1983; 36-8
 A concise delineation of the concept of 'optimisation' in the context of sensory evaluation of foods. Highlight of this paper is a diagram providing various steps in optimisation research. JVS
- 383 GIOVANNI (M). Response surface methodology and product optimisation. *Food Technol.* 37(11); 1983; 41-5, 83
 Response surface methodology (RSM) is a statistical technique that uses quantitative data to determine and simultaneously solve multivariate equations which specify the optimum product for a specified set of factors through mathematical models. These models consider interactions, among the test factors and can be used to determine how the product changes with changes in the factor levels. RSM is more efficient than traditional experimental procedures because it decreases the time and cost required to determine the optimum product. AA
- 384 SCHUTZ (HG). Multiple regression approach to optimisation. *Food Technol.* 37(11); 1983; 46-8, 62
 Multiple regression approach (MRA) to optimisation described in this paper is particularly useful, in areas where less is known by the developer about the sensory properties and their relation to acceptance of the product class. It is also particularly useful when the number of sensory dimensions which may influence consumer acceptance is sufficiently large that developing even an incomplete factorial design for use in methods such as response surface methodology is inefficient. The MRA entails 7 steps which are described. AA

- 385 FISHKEN (D). consumer-oriented product optimisation. *Food Technol.* 37(11); 1983; 49-52
The process of consumer-oriented optimisation, its advantages, examples of its use, difficulties and potential problem have been discussed. The optimisation process places the decision making on the consumer's palate. JVS
- 386 PELEG (M). The semantics of rheology and texture. *Food Technol.* 37(11); 1983; 54-61
A comprehensive account of the objective mechanical property and sensory property of foods. The implications of mechanical properties in both instrumental and sensory evaluations are discussed. JVS
- 387 FROST (J), HEGEDUS (EF) and GLICKSMAN (M). Objective characterization of hydrocolloid organoleptic properties. *Food Technol.* 38(1); 1984; 118-22

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

- 388 BUTTERY (RG), LING (LC), TERANISHI (R) and MON (TR). Insect attractants: Volatiles of hydrolysed protein insect baits. *J. Agric. Food Chem.* 31(4); 1983; 689-92
- 389 JACOB (TA) and FLEMING (DA). Some further observations on the effect of temperature on the fecundity and longevity of *Dermestes lardarius* L. (Coleoptera: Dermestidae). *J. Stored Prod. Res.* 20(1); 1984; 7-9
Fecundity of *D. lardarius* bred on a diet of fish meat, yeast and cholesterol was determined at 65% R.H. and temperatures ranging from 17.5 to 30 C. The medium life span of insects was 223 days (the longest) at 17.5 C to 20 C. At temperatures of 17.5-27.5 C some laid eggs early and others laid the eggs twice. Temperature influenced the quantity of eggs laid. Yield of eggs was maximum at 20 C and minimum at 27.5 C. Egg laying appeared optimal at 20 C. JVS
- 390 EDWARDS (JP) and SHORT (JE). Evaluation of three compounds with insect juvenile hormone activity as grain protectants against insecticide-susceptible and resistant strains of *Sitophilus* species (Coleoptera: curculionidae). *J. Stored Prod. Res.* 20(1); 1984; 11-5
Three compounds with insect juvenile hormone activity have been tested as protectants for wheat grain against one insecticide-susceptible and two insecticide-resistant strains of *Sitophilus granarius*. Neither JH I nor methoprene gave complete control of *S. granarius* at 100 ppm whereas ethyl(2-(p-phenoxy)ethyl)carbamate was effective at only 5 ppm. There was no loss of biological activity of this last compound even after treated grain was stored at 25 C and 70% r.h. for 12 months, and it was also found to be highly active against susceptible strains of *Sitophilus oryzae* and *Sitophilus zeamais*. There was no evidence that two insecticide-resistant strains of *S. granarius* were cross-resistant to any of the compounds tested. AA

- 391 GOWERS (SL) and LE PATOUREL (GNJ). Toxicity of deposits of an amorphous silica dust on different surfaces and their pick-up by *Sitophilus granarius* (L.) (Coleoptera: curculionidae). *J. Stored Prod. Res.* 20(1); 1984; 25-9
A sorptive silica dust applied as aqueous suspensions and dry powder on glass, vinyl and concrete surfaces has been tested for toxicity using *S. granarius*. Dried deposits proved most toxic on glass surface and loose deposits on glass. Maximum amount of the dust was picked up on insect surface in about 24 hours; the quantity picked up during this period was not correlated with the toxicity of the deposit. JVS
- 392 SEARLE (T) and DOBERSKI (J). An investigation of the entomogenous fungus *Beauveria bassiana* (Bals.) Vuill. As a potential biological control agent for *Oryzaephilus surinamensis* (L.). *J. Stored Prod. Res.* 20(1); 1984; 17-23
In laboratory experiments, a soil isolate of *Beauveria bassiana* (Bals.) Vuill, was found to be an effective pathogen of adult *Oryzaephilus surinamensis* (L.) under certain conditions. Experiments on the effect of temperature showed that infection could occur down to 7 C, the lowest temperature tested. Little difference in mortality was noted when beetles were exposed to wheat treated with a range of concentrations of *B. bassiana* conidiospores in suspension (10^6 , 10^5 and 10^4 spores ml⁻¹), but mortality was lower at 10^{-3} spores ml. Humidity level, however, was the critical factor in allowing infection to occur. Beetles became infected at 100% r.h. but not at 90% r.h. When conidiospores of *B. bassiana* were applied to 50 g wheat grain cultures of *O. surinamensis*, the fungus proved ineffective in killing adult beetles. Breeding success, however, was sharply reduced with a 91% decrease in numbers of larvae and pupae in cultures treated with spores of the fungus mixed with the grain. AA
- 393 GREENHALGH (R), BLACKWELL (BA), PRESTON (CM) and MURRAY (WJ). Phosphorus-31 nuclear magnetic resonance analysis of technical organophosphorus insecticides for toxic contaminants. *J. Agric. Food Chem.* 31(4); 1983; 710-13
- 394 BARSON (G). The effect of temperature and humidity on the toxicity of three organophosphorus insecticides to adult *Oryzaephilus surinamensis* (L.) *Pestic. Sci.* 14(2); 1983; 145-52
The toxicities, to a laboratory susceptible strain and to a resistant strain of *Oryzaephilus surinamensis* (L.), of water-dispersible powder formulations of pirimiphos-methyl, fenitrothion or chlorpyrifos-methyl under constant conditions of 25 C and 70% r.h. were compared to the toxicities when the insects were exposed to a diurnal cycle of 12.5-20-12.5 C and 70-50-70% r.h. to simulate grain store conditions in the UK during spring and autumn. All the insecticides were more effective at 25 C and 70% r.h. The LD₅₀ values for the susceptible strain were low, being 4.4 and 1.4 mg m⁻² at 12.5-20 C and 25 C, respectively, for chlorpyrifos-methyl, 18.3 and 4.1 mg m⁻², respectively, for pirimiphos-methyl, and 4.0 and 1.0 mg m⁻², respectively, for fenitrothion. The LD₅₀ values obtained from the two sets of environmental conditions for a resistant strain (484) differed by factors of 1.8 for chlorpyrifos-methyl, 4.8 for pirimiphos-methyl, and 7.3 for fenitrothion. Toxicity studies were also made with chlorpyrifos-methyl under various constant conditions of temperature and humidity from 5-30 C (5 C intervals) and 30, 50, 70 and 90% r.h., and also at 0 C and 60% r.h. Chlorpyrifos-methyl was very effective and there was little or no

cross resistance to chlorpyrifos-methyl in the resistant strain. From 15 to 30 C, mortality was high, and differences in mortality at the LD₅₀ level for the various humidities were slight, but there was a decrease in mortality with decreasing humidity at any one temperature, in particular, at 5 C, 50 and 70% r.h., and 10 C and 50% r.h. Chlorpyrifos-methyl was more toxic to both strains at the highest humidity (90%) throughout the whole temperature range. The LD₅₀ values for each strain decreased at each temperature as the water vapour concentration was increased. At 0 C and 60% r.h., all the insects from both strains died but the cause of death was not clear. AA

- 395 BARKER (PS). Comparison of two pelletized formulations of aluminium phosphide for the control of adults and eggs of the rusty grain beetle. (Coleoptera: Cucujidae). *J. Econ. Entomol.* 76(3); 1983; 599-600
Effectiveness of Brazilian and German formulations of aluminium phosphide were tested in three 12-bushel bulks of wheat. The Brazilian formulation evolved hydrogen phosphide slightly more rapidly than the German formulation; but both the formulations were equally effective. KAR
- 396 KRAUSE (RT) and AUGUST (EM). Applicability of a carbamate insecticide multiresidue method for determining additional types of pesticides in fruits and vegetables. *J. Assoc. Off. Anal. Chem.* 66(2); 1983; 234-40
- 397 YURAWECZ (MP) and PUMA (BJ). Nitro musk fragrances as potential contaminants in pesticide residue analysis. *J. Assoc. Off. Anal. Chem.* 66(2); 1983; 241-7
- 398 BANDYOPADHYAY (TS), CHAKRABARTI (J) and ROY (BR). Rapid determination of pesticides in fatty foods. *J. Food Sci. Technol. (India)* 20(4); 1983; 144-6
The method consists of extracting pesticides from oil or fatty foods with acetone and acetonitrile, passing the extract through a column containing silanized glass wool topped with activated charcoal and concentrating the eluate. The concentrate is analysed by GLC and/or TLC within 45 minutes. Recovery percent with mustard oil, groundnut and milk was 99+1. The method is useful for chlorinated and organophosphorus pesticides. KAR

BIOCHEMISTRY AND NUTRITION

- 399 MAHESHWARI (N) and SHASHI BHARAL. New plants through genetic engineering. *Sci. Rep.* 20(7); 1983; 382-8
- 400 VETTER (JL). Fiber as a food ingredient. *Food Technol.* 38(1); 1984; 64-5, 68-9
A comprehensive review of the medical aspects of fiber in the diet may be found in a special supplement to the October 1978 issue of the American Journal of Clinical Nutrition. This article will discuss characteristics and applications of high-fiber ingredients. AA
- 401 CREWS (HM), ALAN BURRELL (J) and McWEENY (DJ). Preliminary enzymolysis studies on trace element extractability from food. *J. Sci. Food Agric.* 34(9); 1983; 997-1004
A preliminary investigation into the availability to man of some trace elements in foodstuffs is reported. The amounts of soluble lead, cadmium,

zinc, iron and copper after a simulated digestion procedure, were measured in cereals, meats, fish and non-root vegetables consumed in UK. Details of the enzymolysis procedure and acid digestion method are given. The results show that the amount of soluble analyte varies widely from element to element and according to food type. When added to food the behaviour of soluble inorganic forms of the elements is often markedly different to that of the endogenous elements. The implications of some of these differences are considered. AA

- 402 CONSAUL (JR) and LEE (K). Extrinsic tagging in iron bioavailability research: A critical review. *J. Agric. Food Chem.* 31(4); 1983; 684-9
Discusses: measurement of iron bioavailability; extrinsic tag method; conditions required for successful tagging; and safety and ethical considerations. BSN
- 403 ELLIOTT (JG) and McCLURE (D). Sources of variance in the bioassay of protein value. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 46-57
A factorial design was used to evaluate simultaneously the relative effect of 8 experimental factors, and their interactions, on the weanling rat bioassay of protein value, viz: (1) source of protein: i.e. ANRC casein, lactalbumin, and high protein wheat flour; (2) protein level of diet: 5% and 10%; (3) dietary fat level: 10% and 20% corn oil; (4) animal: ARS-Sprague Dawley from Taconic farms; (5) age of animal: 21 and 28 days; (6) acclimatation time: 2 and 4 days; (7) replication: two complete replications in time; and (8) duration of test. All the 8 factors and their interactions appeared to significantly influence the measured PER values. The results show that assay time may be reduced from 28 days to 21 days. KMD
- 404 PHILLIPS (RD). A scheme for the rapid preparation of protein hydrolyzates for amino acid analysis. *J. Food Sci.* 48(1); 1983; 284-5
- 405 AMUBODE (FO) and FETUGA (BL). Proximate composition and chemical assay of the methionine, lysine and tryptophan concentrations of some forest tree seeds. *Food Chem.* 12(1); 1983; 67-72
The proximate compositions of the seeds of twenty-five species of tree were determined and methionine, lysine and tryptophan were colorimetrically estimated. KAR
- 406 CUG (JC) and CHEFTEL (JC). Tryptophan degradation during heat treatments. Part I. The degradation of free tryptophan. *Food Chem.* 12(1); 1983; 1-14
Degradation of tryptophan during thermal treatments in a 90-140 C temperature range was investigated. The effects of oxygen, of time and of pH were also investigated. Tryptophan was determined mainly by HPLC and UV absorbance. KAR
- 407 QUILARTE (TR). Radiometric microbiological assay of vitamin B₆: Assay simplification and sensitivity study. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 58-61
Several modifications have been made in the older method of microbiological assay of vitamin B₆. These modifications have increased the sensitivity of the assay to 0.25 ng pyridoxine (PN), pyridoxal (PL), μ pyridoxamine (PM) per vial level, and decreased the amount of medium and labeled substrate (i.e. L-(1-¹⁴C)valine) used, thus reducing assay cost. KMD

- 408 BIRCH (GC) and PEPPER (T). Protection of vitamin C by sugars and their hydrogenated derivatives. *J. Agric. Food Chem.* 31(5); 1983; 980-85
- 409 OMAVE (ST), CHOW (FI) and BETSCHART (AA). In vitro interactions between dietary fibre and ^{14}C -vitamin D or ^{14}C -vitamin E. *J. Food Sci.* 48(1); 1983; 260-61
- 410 GREGER (JL) and BAIER (MJ). Excretion and retention of low or moderate levels of aluminium by human subjects. *Food Chem. Toxicol.* 21(4); 1983; 473-7

During a 40-day balance study, eight adult males were fed two levels of aluminium: 5 mg/day for 20 days (control diet) and 125 mg/day for 20 days (test diet). Every subject excreted more than 96% and more than 74% of his aluminium intake in his faeces when fed the test and control diets, respectively. Subjects excreted two- to five-fold more aluminium in their urine and had significantly higher levels of aluminium in their sera when fed the test diet rather than the control diet. No retention of aluminium was detected when faecal and urinary losses of aluminium were compared with intakes. AA

TOXICOLOGY AND HYGIENE

- 411 BELL (RR) and SPICKETT (JT). The influence of dietary fat on the toxicity of orally ingested lead in rats. *Food Chem. Toxicol.* 21(4); 1983; 469-72
- The study was undertaken to ascertain whether the dietary fat level, influenced tissue fat accumulation in rats exposed to low lead levels (fed in fat). Level of dietary fat was found to significantly increase lead toxicity and indicated the need for further research. Requisite data have been presented. JVS

- 412 GREVE (PA). Bromide-ion residues in food and foodstuffs. *Food Chem. Toxicol.* 21(4); 1983; 357-9

The daily consumption of bromide through food materials was studied by analysis of more than 101 samples in 1976 and 1978. The average daily intake was 7.8 mg/100 g and 7.6 mg/100 g respectively. Leafy vegetables and some herbs occasionally contained more than 200 mg/kg. Soil treatment with methyl bromide was an important source of bromide in food. JVS

- 413 WEGMAN (RCC), HAMAKER (Ph) and HEER (HDC). Bromide-ion balance of a Polder district with large-scale use of methyl bromide for soil fumigation. *Food Chem. Toxicol.* 21(4); 1983; 361-7

In Polder district, Netherlands, where soil had been fumigated with MB, its levels in precipitation, surface water and ground water were 0.98, 41 and 17 g/m³ respectively. On an average in a year, over 14% of the MB used for soil fumigation was converted into bromide ion. JVS

- 414 POULSON (E). International symposium on residues and toxicity of bromide: Summary and conclusions. *Food Chem. Toxicol.* 21(4); 1983; 421-2
- Discusses advantages/disadvantages of analytical methods for bromide; residue data on classified foodstuffs and items; bromide-ion balance during large-scale soil methyl bromide fumigation ecotoxicological studies on sodium bromide specially on its acute toxicity to fresh water organisms; pharmacokinetics of bromide ion; highlighting the feature of greater foetal

accessibility of bromide than of mother, and retarded process of elimination; toxic effects of bromide in the rat; and human volunteer studies. In conclusion/it is indicated that although human study is not final, the "no-effort levels in humans might be 4 mg/kg body weight/day". JVS

- 415 FORD (GP), GOPAL (T) and GAUNT (IF). Short-term-toxicity of 4-methyl-1-phenylpentan-2-ol in rats. *Food Chem. Toxicol.* 21(4); 1983; 441-7
Groups of 15 male and 15 female rats were given diets to provide intakes of 0 (control), 10, 40 or 160 mg 4-methyl-1-phenylpentan-2-ol/kg/day for 13 weeks. No effects attributable to treatment were seen in the 10-mg/kg/day dose group. At 40 mg/kg/day the only finding was a decrease in serum glucose in males. This was of questionable toxicological significance. At 160 mg/kg/day a reduction in weight gain, probably due to unpalatability, a mild proteinuria in the females, an increased relative liver weight in males, increased caecal weights, a reduction in serum glucose and a lower reticulocyte count were recorded. No changes were observed in the histopathological examination. The no-untoward-effect level established in this study was 10 mg/kg/day. AA
- 416 FRASER (J). Control of carcinogens in food. *Food Technol. NZ.* 18(6); 1983; 13,16,17,20
Covers mainly the occurrence of different carcinogens like food additives, food contaminants including asbestos, pesticides, aflatoxin, nitrosamines and polycyclic aromatic hydrocarbons. KAR
- 417 MOSSEL (DAA), RICHARD (N), GAYRAL (JP) and BRISSUEL (C). A comparative study of tests to be used in the preliminary taxonomic grouping of bacteria isolated from foods, drinking water and medicinal preparations. *Sci. Aliment.* 3(1); 1983; 91-115 (French)
- 418 FERREIRA (JL), HAMDY (MK), ZAPATKA (FA) and WEBERT (WO). Immunodiffusion method for detection of *Clostridium botulinum* types A, B, E, and F. *J. Food Safety.* 5(2); 1983; 87-94
- 419 LYNT (RK), KAUTTER (DA) and SOLOMON (HM). Effect of delayed germination by heat-damaged spores on estimates of heat resistance of *Clostridium botulinum* types E and F. *J. Food Sci.* 48(1); 1983; 226-9
- 420 KOO (FCW) and PETERSON (JW). Effects of cultural conditions on the synthesis of *Salmonella* toxin. *J. Food Safety.* 5(2); 1983; 61-71
- 421 KRUMPERMAN (PH). Multiple antibiotic resistance indexing of *Escherichia coli* to identify high-risk sources of fecal contamination of foods. *Appl. Environ. Microbiol.* 46(1); 1983; 165-70
Escherichia coli isolates taken from environments considered to have low and high enteric disease potential for humans were screened against 12 antibiotics to determine the prevalence of multiple antibiotic resistance among the isolates of these environments. It was determined that multiple-antibiotic-resistant *E. coli* organisms exist in large numbers within the major reservoirs of enteric diseases for humans while existing in comparatively low numbers elsewhere. These differences provide a method for distinguishing high-risk contamination of foods by indexing the frequency with which multiple-antibiotic-resistant *E. coli* organisms occur among isolates taken from a sample. AA

- 422 SCHIEMANN (DA). Alkalotolerance of *Yersinia enterocolitica* as a basis for selective isolation from food enrichments. *Appl. Environ. Microbiol.* 46(1); 1983; 22-7
- 423 SCHMIDT (RH), DAVIDSON (SM) and LOWRY (SP). Determination of acetaldehyde in *Streptococcus lactis* cultures as 2,4-dinitrophenylhydrazine by high-performance liquid chromatography. *J. Agric. Food Chem.* 31(5); 1983; 978-80
- 424 RAO (PV) and RAVINDRA REDDY (V). Aflatoxin - its adverse effect and detoxification methods. *Poult. Guide* 20(5); 1983; 31-44
- 425 LAU (HP) and CHU (FS). Preparation and characterization of acid dehydration products of aflatoxinol. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 98-101
- 426 WISEMAN (DW) and MARTH (EH). Stability of aflatoxin M₁ during manufacture and storage of ice-cream and sherbet. *Z. Lebensmittel-Unters. Forsch.* 177(1); 1983; 22-4

Ice-cream and orange sherbet were made from naturally contaminated milk to determine how aflatoxin M₁ (AFM₁) behaves during manufacture and storage of these products. Both were formulated to represent low-cost commercial products. AFM₁ was stable to freezing in both products. The AFM₁ content of ice-cream remained stable through 8 months of frozen storage. There was an apparent increase of AFM after sherbet mix was prepared from milk. This increase may have resulted because of improved recovery of bound AFM₁. As with ice-cream, AFM₁ remained stable in sherbet through 8 months of frozen storage. AA

GENERAL

427 JAIN (HK). Scientific transformation of Indian Agriculture - the second phase. *Curr. Sci.* 52(11); 1983; 528-34

428 HENON (Y). Current topics in Food and Agricultural Industries: Ionizing treatment of agro-food products: a technique for the 1980s. *Ind. Aliment. Agric.* 100(1-2); 1983; 45-52 (French)

The author has briefly reviewed the process of ionization treatment of foods, the regulations that apply thereto, the principal applications of the treatment, and the equipment installed for giving such a treatment. The type of ionizing treatments that are authorized in 13 countries for 21 different kinds of food products have been reported in a table; a more detailed table of the treatments already authorized in France, and under consideration, is also given. KMD

429 ANON. GIA 1982 - Processes, Materials, and Techniques - Comments, reflections. *Ind. Aliment. Agric.* 100(1-2); 1983; 69-127

Products, machines, equipment, etc. exhibited at the GIA (Food Industries Engineering Exhibition) have been presented, with brief accompanying notes, in the alphabetical order of exhibitors. KMD

430 FROSCHER (H). The bulk transport of raw materials. *Gordian.* 83(3); 1983; 48-9 (German)

The vehicles and procedures used for the transport, in bulk, of products like rusk fragments, egg powder, yeast, cocoa powder, sugar, and of cereals like maize, rice, and wheat have been described briefly. KMD

431 HURIA (VK) and ACHAYA (KT). Meeting basic needs through micro-planning: Central role of essential forestry. *Econ. Pol. Wkly.* 18(35); 1983; 1527-38

The agricultural and animal systems required for micro-planning have been described. BSN

432 NORBACK (JP). Structuring and disseminating technological information for decision making. *Food Technol.* 37(12); 1983; 33-5

433 KLEIN (BP). Nutrient analysis information for decision making. *Food Technol.* 37(12); 1983; 37-9; 54

434 HELDMAN (DR). Waste-management information for decision making. *Food Technol.* 37(12); 1983; 41-3

435 MATTHEWS (ME). A food service information framework for decision making. *Food Technol.* 37(12); 1983; 46-9

This article describes a framework for structuring and integrating region-wise information into a decision-support computer model and illustrate how information can be organised for a specific food service application. AA

436 THOMPSON (DR). Delivering food processing information to decision makers. *Food Technol.* 37(12); 1983; 50-54

437 DUDEK (JA) and ELKINS (ER) Jr. Nutrient composition of historical canned food samples. *J. Food Sci.* 48(2); 1983; 654-5

Several historical food samples were analyzed for nutrient and mineral composition. The samples included a 40-year old can of sweet corn, relish found aboard the sunken U.S.S. Monitor and seven samples recovered from the sunken steamboat Bertrand. The nutrient content of the canned corn compared favourably with reported values, with the exception of lower amounts of ascorbic acid. Significant levels of riboflavin, niacin, carotene and protein were found in the pickle relish. The samples recovered from the Bertrand contained calcium levels comparable to today's products, but the sodium levels were higher and potassium levels were lower. AA

- 438 ANON. Protein from biotechnology. *Food Eng. Int.* 8(3); 1983; 31-3
- 439 BLENFORD (DE). Snacks for the 1980's. *Food Flavour Ingred. Process. Packag.* 5(2); 1983; 10-11
- Discusses: what is a snack; search for innovation; snack products for the early 80's; meat and fish based snacks; shelf stable lines development; and probable future approaches. BSN

FOOD PROCESSING AND PACKAGING

PROCESSING

- 440 CARBONELL (JV), PINAGA (F) and PENA (JL). Solar drying of food products. III. Description of a pilot dryer and evaluation of the flat plate collectors. *Rev. Agroquim. Tecnol. Aliment.* 23(1); 1983; 107-18 (Spanish)
- A prototype of solar dryer which incorporates a dessicant bed for energy storage is described. Results are reported on the performance studies carried out in order to evaluate the feasibility of such installation in the drying of fruits and vegetables. Hot air up to 27 C above ambient is obtained in the one glass collector (drying circuit) with an air flow of 140 kg/hour which rises to 52 C for 25 kg/hour. In the adsorbent circuit, which uses two glass collectors, temperature differences are 10% higher. Instantaneous efficiencies reach values between 11 and 42% for the one glass collector and between 26 and 60% for the two glass collector. Performance parameters defined by Whillier (*Solar Energy*, 8, 31-37, 1964) are determined for both type of collectors; values of these parameters are similar to those reported in literature. AA
- 441 MNKENI (AP) and BEVERIDGE (T). Thermal destruction of 5-methyltetrahydrofolic acid in buffer and model food systems. *J. Food Sci.* 48(2); 1983; 595-9
- Thermal kinetic data (rate constants, k, and activation energies, Ea) for 5-Methyltetrahydrofolic acid ($5\text{-CH}_3\text{-H}_4\text{PteGlu}$) were determined in citrate buffers (pH 3-6) and in model food systems between 100 and 140 C. As pH increased from 3.0 to 6.0, the rate constants decreased as the temperature increased from 100 to 130 C, the rate constants increased. Ea values were 19.0, 17.0, 19.7 and 19.8 kcal/mole at pH 3,4,5 and 6, respectively. In the model food systems, the Ea values (kcal/mole) were 7.85 in apple juice and 10.6 in tomato juice. When dissolved oxygen content was reduced to 5.3 ppm, the stability of the $5\text{-CH}_3\text{-H}_4\text{PteGlu}$ was increased substantially. AA
- 442 DIEHL (JF). Food irradiation. Status and prospects. *Food Flavour. Ingred. Process. Package.* 5(7); 1983; 47, 49-50

- 443 TOUPIN (CJ), MAGUER (MLE) and MCGREGOR (JR). The evaluation of BET constants from sorption isotherms data. *Food Sci. + Technol.* 16(3); 1983; 153-66
- 444 OSWIN (CR). Isotherms and package life: Some advances in emballistics. *Food Chem.* 12(3); 1983; 179-88

- 445 ANGELETTI (S) and MORESI (M). Modelling of multiple-effect falling-film evaporators. *J. Food Technol.* 18(5); 1983; 539-63

The classic mathematical model of multi-effect evaporators operating in forward flow was combined with an accurate estimation of the overall heat transfer coefficient (HTC) in falling-film evaporators. For this, correlation developed by Narayanamurthy & Sarma (1977) has been used. It was possible also to estimate the order of magnitude of the fouling factor (R_d). Finally, the design of an orange-juice double-effect falling-film evaporator (DEFPE) system was carried out according to two different strategies. AA

PACKAGING

- 446 GRUNDKE (G). Necessary lessons from damage to foods and their packages. *Lebensmittel-industrie.* 30(7); 1983; 292-4 (German)
- An encyclopedia (or lexicon) on possible damages to food and food packages has been compiled at the Commercial College in Leipzig in the Department of Merchandise Science. The author shows what questions have to be answered to prevent damage, and what information material is available to protect food products from damage, as they move from the producer to the consumer, and to prevent changes in the food and its packaging. Illustrative examples are provided from the text of the lexicon. KMD
- 447 ROSE (P). Aluminium in foil packaging. *Food Flavour. Ingrid. Process. Packag.* 5(2); 1983; 45, 47
- 448 LANE (J). Promising developments for aluminium foil packaging approach take-off point. *Food Flavour. Ingrid. Process. Packag.* 5(2); 1983; 39, 41, 43
- 449 GOWRAMMA (RV), MAHADEVIAH (M) and NARESH (R). Physico-chemical characteristics of commercial samples of OTS (open top sanitary) quality tinplate. *Indian Food Packer.* 37(4); 1983; 38-41
- The physico-chemical characteristics of tinplate including the tin coating, weight, grain size structure of tin coating and porosity have been studied. OTS cans imported from Taiwan, Hong Kong and South Korea to India have been analysed and compared with those made in India. Thickness of tinplate (0.25 mm) did not vary much from different countries. BSN
- 450 BARBIERI (G), MILANESE (G), ROSSO (S) and CORRADI (T). Tinplate for containers for canned foods from silicon-kilned continuously cast steel. *Ind. Conserve.* 58(1); 1983; 26-7 (Italian)
- Pear juice, comminuted tomatoes, vegetables in vinegar and tomato concentrate were canned under commercial conditions using cans which differed only in the composition of tinplate base-steel, i.e. silicon-kilned continuously cast steel and, for comparison purposes, aluminium-kilned continuously cast steel or ingot-cast steel. It was observed that the presence of silicon in the steel in amounts higher than common ones did not give rise, during storage of the cans for 24 months at 20 C, to significant behaviour differences in comparison with the other two materials. AA

- 451 BARBIERI (G), CASALINI (A), MARCHESINI (D), ROSSO (S) and ALDINI (R). Reduction of contamination in soldered tinplate cans (part. II). *Ind. Conserve.* 58(1); 1983; 7-9 (Italian)

Having ascertained in a previous investigation that lead solubilization from conventional cans (i.e. cans with soldered side seam) came mostly from the soldered zone, the authors carried out long-term preservation tests with kidney beans in brine, apricot nectar and tomato paste packed in plain or lacquered cans with or without protection of the side seam by spraying with a vinyl lacquer. It was found that lead level in the canned products generally remained lower than the average value of 0.5 ppm, even after two years. AA

- 452 BARBIERI (G), MILANESE (G), ROSSO (S) and CORRADI (T). Welded cans. *Ind. Conserve.* 58(3); 1983; 86-9 (Italian)

An important aspect of the behaviour of tinplate cans with welded side seam was investigated by carrying out periodical determinations of the iron taken up by five of the most representative types of canned foods. During 24 months of storage at room temperature, no significant differences were found in comparison with the same products packed in conventional cans with soldered side seam. AA

- 453 NIEBERGALL (H) and KUTZKI (R). Investigations on the migration of ingredients from packing materials into foodstuffs. Part IV. Deducting and applying analogy relations. *Dtsch. Lebensmittel-Rundschau.* 79(1); 1983; 10-19 (German)

- 454 ROSE (P).. Liquid packaging. A developing technology. *Food Flavour. Ingrid. Process. Packag.* 5(6); 1983; 26-8

- 455 PETERSON (WR) and ADAMS (JP). Water velocity effect on heat penetration parameters during institutional size retort pouch processing. *J. Food Sci.* 48(2); 1983; 457-9, 464

Institutional size retort pouches (15 x 12 x 1") filled with 10% bentonite were processed in water with overriding air pressure. The heat penetration parameter, f_h , was measured at seven flow rates from 10 gal/minutes ($Re = 3000$) to 110 gal/minutes ($Re = 33000$). Apparent convection heat transfer coefficients (h -values) were calculated. Significant differences were found for both the h -value and observed f_h value as a function of flow rate. The h -values ranged from 33-48 BTU/hour feet² F and the observed f_h values ranged from 23.0-20.1 minutes for 10 and 110 gal/minutes, respectively. AA

FOOD ENGINEERING AND EQUIPMENT

- 456 RODRIGO (M), SAFON (J) and LORENZO (P). Optimization of heat sterilization techniques. III. Temperature measurement and control. *Rev. Agroquim. Tecnol. Aliment.* 23(1); 1983; 11-26 (Spanish)

The following different techniques of temperature measurement and control have been reviewed: (1) expansion, or dilatation, thermometers; (2) electrical or electronic instruments - e.g. thermocouples, thermistors, platinum resistance thermometers, semi-conductor sensors, capacitance sensors, quartz sensors; (3) radiotelemetry and accumulation (recording) of measurements. Errors in the measurement of temperature have also been mentioned. KMD

- 457 BOUILLIEZ (L). Dust explosions - means of prevention. *Indus. Aliment. Agric.* 100(1-2); 1983; 55-61 (French)

After outlining briefly the importance of the problem, the author has defined the conditions under which dust explosions can be produced and the mechanism of such an explosion. Methods of preventing dust explosions have also been reviewed, and finally, the characteristics of a filtering, anti-explosion, dust-remover have been studied. KMD

- 458 GADONNEIX (MP). The French agro-food equipment industry. *Indus. Aliment. Agric.* 100(1-2); 1983; 43-4 (French)
- 459 MOHAMED (D). Microelectronics in the food industry. *Food Flavour. Inghed. Process. Packag.* 5(2); 1983; 31, 33
- 460 SUTCLIFFE (I). Robot applications in the food industry. *Food Flavour. Inghed. Process. Packag.* 5(2); 1983; 17, 19, 21

ENERGY IN FOOD PROCESSING

- 461 UNKLESBAY (N). Integration of energy data into food industry decision making. *Food Technol.* 37(12); 1983; 55-9, 110

A review of current issues related to energy sources and organisational structures and decision making - indicating where diverse disciplines may be synchronised for effective policy and technical decision making throughout the food industry. Future projection on energy management in food industry is dealt with. JVS

FOOD CHEMISTRY AND ANALYSIS

- 462 SCOTT (VN) and BERNARD (DT). Influence of temperature on the measurement of water activity of food and salt systems. *J. Food Sci.* 48(2); 1983; 552-4

The water activity of four salt slurries (barium chloride, potassium bromide, cobalt chloride and sodium bromide) and four foods (cheese spread, fruit preserves, chocolate frosting and fudge sauce) was determined 10 times at approximately 20 C, 25 C and 30 C using an electric hygrometer. In general, an increase in temperature resulted in a decrease in water activity. The magnitude of the decrease was typically greater between 25 C and 30 C than between 20 C and 25 C. This decrease was also greater when the substrate under test was in the lower a_w range. Thus temperature control is very important in inter-laboratory comparisons and when measuring water activity levels near critical values. AA

- 463 FAVETTO (G), RESNIK (S), CHIRIFE (J) and FONTAN (CF). Statistical evaluation of water activity measurements obtained with the Vaisala Humicap humidity meter. *J. Food Sci.* 48(2); 1983; 534-8

The objective of this study was to determine the suitability, precision and accuracy of the Vaisala Humicap electric hygrometer for a_w measurements in the range 0.752-0.974 (at 25 C). Results of the statistical evaluation indicated that this hygrometer, when calibrated and operated as described here, provides a convenient and fast means of a_w measurement having adequate accuracy and precision for most applications. AA

- 464 CAURIE (M). Raoult's law, water activity and moisture availability in solutions. *J. Food Sci.* 48(2); 1983; 648-9
- 465 LUTHER (H), WEBER (E) and SCHUSTER (E). A contribution to the characterization of the water-absorbing capacity of proteins. *Nahrung.* 27(3); 1983; 265-71 (German)
- A general method for determining the water-absorbing capacity of proteins is described. To calculate their water absorbing capacity, the proteins are centrifuged off and then added with portions of water to determine the amount of water required for just obtaining an aqueous supernatant (in case of insoluble proteins) or for obtaining a paste which is beginning to flow (in case of soluble proteins). The correlation between the "modified centrifugation method" and the Grau-Hamm pressing method for determining the "juice loss", a method that is currently used in practice, is demonstrated by some examples. AA
- 466 ZEMEL (MB) and BIDARI (MT). Zinc, iron and copper availability as affected by orthophosphates, polyphosphates and calcium. *J. Food Sci.* 48(2); 1983; 567-9, 573
- 467 DAY (BPF) and GREGORY (JF) III. Thermal stability of folic acid and 5-methyltetrahydrofolic acid in liquid model food systems. *J. Food Sci.* 48(2); 1983; 581-7, 599
- 468 MASON (M). Determination of glucose, sucrose, lactose, and ethanol in foods and beverages using immobilized enzyme electrodes. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 981-4
- An enzyme electrode coupling immobilized oxidase enzymes with a hydrogen peroxide-sensitive electrode is described. An enzyme or enzymes are immobilized in a thin microporous membrane which fits directly over a platinum anode held at +0.700 V relative to a Ag/AgCl₂ reference electrode. When an enzyme substrate diffuses into the membrane, hydrogen peroxide is produced. The hydrogen peroxide is then oxidized at the platinum anode, producing an electrical current that is directly proportional to hydrogen peroxide concentration, and hence substrate concentration. Glucose and sucrose in cereal samples, lactose in cheese, and ethanol in beer and wine were determined using enzyme electrodes. Relative precision of replicate analyses was better than ±2% and agreement with AOAC methods was good. AA
- 469 TOWNSEND (A-A) and NAKAI (S). Relationships between hydrophobicity and foaming characteristics of food proteins. *J. Food Sci.* 48(2); 1983; 588-94
- 470 KORN (M). Fundamentals and utilization possibilities of pulse NMR spectroscopy in food technology and packing. *Dtsch. Lebensmittel-Rundschau.* 79(1); 1983; 1-9 (German)
- 471 DEBICKI-POSPISIL (J), LOVRIC (T), TRINAJSTIC (N) and SABLJIC (A). Anthocyanin degradation in presence of furfural and 5-hydroxymethylfurfural. *J. Food Sci.* 48(2); 1983; 411-6

- 472 HUNG (YC) and THOMPSON (DR). Freezing time prediction for slab shape food-stuffs by an improved analytical method. *J. Food Sci.* 48(2); 1983; 555-60
- An improved analytical method for predicting the freezing time with one dimensional heat transfer for slabs was developed. Tylose-MH-1000 was used as a model test material. The new model is similar to Plank's equation, but has a more theoretical basis. Total enthalpy difference instead of latent heat and weighted average temperature difference instead of the temperature difference between initial freezing point and freezer temperature were used in the improved prediction method. Linear regression was used to estimate shape parameters. Four different foods were used to test the model. Predicted times for foods were within 6% of the measured times. AA
- 473 LANG (KW) and STEINBERG (MP). Characterization of polymer and solute bound water by pulsed NMR. *J. Food Sci.* 48(2); 1983; 517-20, 538
- 474 WESTPHAL (G) and CIESLIK (E). Studies on the Maillard reaction. Part VIII. On the reaction of glucose with phenylalanine in *n*-octanol. *Nahrung.* 27(1); 1983; 55-62 (German)
- 475 STAMP (JA) and LABUZA (TP). Kinetics of the Maillard reaction between aspartame and glucose in solution at high temperatures. *J. Food Sci.* 48(2); 1983; 543-4, 547
- 476 HENNING (W). Determination of saccharin in foodstuffs with complex matrices by isocratic ion-pair HPLC. *Dtsch. Lebensmittel-Rundschau.* 79(1); 1983; 16-19 (German)
- Saccharin is extracted from foodstuffs using 70% methanol, concentrated and cleaned up on RP-18 phase, in a second step, the sweetener is analysed by isocratic ion-pair HPLC on LiChrosorb Si 60 RP-18 (7 μ m) phase. Amounts below 5 ppm in foods may be analysed. Recapability is 103 $\pm$ 3%, yields of mustard samples. This method is applied to foods of complex matrices, e.g. mustards, delicacies and dietetics. AA
- 477 HUI (JY) and TAYLOR (SL). High pressure liquid chromatographic determination of putrefactive amines in foods. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 853-7
- The amines were extracted from tuna or cheese with methanol. Further cleanup was performed by sequential extractions with butanol and HCl. The acid extract was dried, and residues were derivatized with dansyl chloride. HPLC separations were performed on an Ultrasphere-ODS column at 33 C. A gradient elution program was used; the total elution time was less than 17 minutes. Linear standard curves with high correlation coefficients were obtained. The procedure allowed good recoveries of histamine, tyramine, putrescine, and cadaverine; recoveries of tryptamine and β -phenylethylamine were lower but constant. With this method, some Swiss cheese samples were found to contain considerable amounts of histamine, tyramine, putrescine, cadaverine, and β -phenylethylamine. Canned tuna samples had very low levels of these amines. Since the presence of amines at high levels has been associated with tuna decomposition, this method may be useful in identifying decomposed fish. AA
- 478 CARY (EE) and RUTZKE (M). Electrothermal atomic absorption spectroscopic determination of chromium in plant tissues. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 850-52

- 479 VEERABHADRA RAO (M) and KAPUR (OP). Spectrophotometric determination of dulcin (*p*-ethoxyphenyl urea) in foods. *Food Chem.* 12(2); 1983; 109-13

In this method, dulcin is hydrolysed with 6N sodium hydroxide under reflux, the hydrolysed dulcin is oxidised at pH 3.0 with sodium hypochloride and coupled with phenol at pH 10.0 to give an indophenol which absorbs at 630 nm. AA

- 480 WINKLER (G) and WEITZMANN (L). On the analysis of phenolic plant components. I. Influence of water on the determination of condensed tannins by means of the vanillin test. *Nahrung.* 27(1); 1983; K3-K5 (German)

The authors' earlier suspicion that the water-content of the test solutions has a great influence on colour formation in the vanillin/hydrochloric acid method of Burns has been confirmed. Relatively large flavonoids which are insoluble in methanol and other aliphatic alcohols may be easily dissolved in water - say, during protein extraction - and lead to undesirable reactions. Hence, their accurate and specific determination is of great importance. Burns's test, after suitable adaptation, may be used for this purpose. KMD

FOOD LAWS AND REGULATIONS

Nil

FOOD MICROBIOLOGY

- 481 BARVE (SS) and KULKARNI (PR). Rapid methods of microbiological analysis of foods: a review. *Indian Food Packer.* 37(4); 1983; 60-70

Aspects covered include: radiometry, micro calorimetry, electrical impedance, immunological methods (fluorescent anti-body technique, enzyme linked immunological procedure) glc, affinity chromatography, bioluminescence, biological methods, cell and colony counting technique, biochemical identification kits, and the automated hydrophobic gridmember filter technique, for microbiological assay of foods. BSN

- 482 DANIELSSON-THAM (M-L) and HOLM (K). Bacteriological quality of sprouts and salads containing sprouts. *Var Foda.* 35(1); 1983; 11-9 (Swedish)

Ready-to-eat foods containing sprouts had a high aerobic plate count, and large numbers of 37 C coliform bacteria. Different ways of decreasing the numbers of bacteria were tested - e.g. shorter soaking time, sprouting in sterile utensils, frequent rinses during sprouting, and a careful final rinse - but none of these methods gave sprouts of good bacteriological quality. In order to estimate the risks of food poisoning, 319 bacterial strains isolated from VRG agar were biochemically typed. It is concluded that correctly handled and stored foods containing sprouts constitute a minimal risk. Finally, the bacteriological parameters to be used in the hygienic control of sprouts are discussed. KMD

- 483 BARON (DL). Temperature reduction of the viable bacterial counts of processed food. *Food Flavour. Ingrid. Process. Packag.* 5(1); 1983; 14, 17

- 484 MARIN (A) and MARSHALL (RT). Production of glycosidases by psychrotrophic bacteria. *J. Food Sci.* 48(2); 1983; 570-73

Six of 19 psychrotrophic bacteria common in milk and meat hydrolyzed large amounts of p-nitrophenyl-glycosides during 48 hours in minimal growth broth at 20 C. Four of the 19 were inactive against the four glycosides used in the screening tests, and nine were weakly active. In tests of the six active cultures against 11 p-nitrophenyl-glycosides, strains of *Enterobacter* had more glycosidase activity than strains of *Pseudomonas*; β -anomers were hydrolyzed more rapidly than α -anomers, more p-nitrophenol was released from the β -D-galactoside than from other substrates, there was activity against the D form but not the L form of fucoside, and p-nitrophenyl β -D-glucoside was hydrolyzed at about the same rate by each culture. AA

- 485 KELLY (CT) and FOGARTY (WM). Microbial α -glucosidases. *Process Biochem.* 18(3); 1983; 6-12.

Discusses: occurrence; extracellular bacterial α -glucosidases; intracellular bacterial α -glucosidases; yeast α -glucosidases; and properties other than substrate specifications. BSN

- 486 WESENBERG (J), KNEBUSCH (M) and SEYFARTH (W). Working techniques for gas-chromatographic analysis of fermentation by-products in fermentation media and end products. Part 2. Working instructions for in-plant process control. *Lebensmittel-industrie.* 30(7); 1983; 317-20 (German)

Operating instructions have been provided for the quantitative detection of important groups of fermentation by-products, such as esters, higher alcohols, and vicinal diketones, in fermenting cereal mashes, raw rye brandy, fine rye distillates, primary spirit, industrial spirit, fusel oil, lautering water and waste-water, young beer and beer, clear and extract-containing spirits, and fermentation CO₂ (including detection of extraneous gases). The method employs only apparatus and chemicals that are available in the GDR. KMD

- 487 PANG (KA), CARROAD (PA) and WILSON (AW). Effect of culture pH on D value, cell growth and sporulation rates of P.A. 3679 spores produced in an anaerobic fermentor. *J. Food Sci.* 48(2); 1983; 467-70

- 488 TULYAKOVA (TB) and SEMICHATOVA (NM). Manufacture of bakers' yeast by process control based on an adjustable model. *Lebensmittel-industrie.* 30(7); 1983; 314-6 (German)

In order to optimize work with a 200 m³ fermenter, an adjustable model was used to work out the control algorithm; the fifth hour of cultivation was taken as an example. During this stage of the process, an increase of 6-7% in the yield of yeast was obtained by means of this algorithm. KMD

- 489 REICHART (O). Experimental method for the determination of the thermal death parameters of microorganisms in a continuous system. *Acta Aliment.* 12(1); 1983; 35-53

In a reactor of controlled temperature mixed to perfection the suspension of microorganisms of known viable cell density is fed in a flow of constant volume. The viable cell count is determined in the out-going fluid. In the case of the applied experimental layout, the death rate coefficient may be determined from the quotient of the in-going and out-going viable cell density in contrast to traditional methods, where the basis of calculation is formed by the logarithm of the quotient of the initial and surviving cell counts. Thus, this new method is suitable to determine experimentally death rate coefficients 1-1.5 orders of magnitude higher than the traditional ones, while at lower temperatures the results correspond to those obtained by the traditional methods. The test organisms used in the experiments were the yeast strains *Saccharomyces cerevisiae* and *Rhodotorula rubra* and the bacteria

Escherichia coli and *Streptococcus faecalis*. The temperature range applied was 323-349 K (50-76 C). In this range, the logarithm of death rate coefficients increased linearly with increasing temperature. The lowest decimal reduction times determined in the experiments were about 0.003 minutes. AA

- 490 WIESNER (P) and CASOLARI (A). Water activity and radial growth rate in *Aspergillus* strains. *Ind. Conserve.* 58(2); 1983; 82-5 (Italian)

The radial growth rates of four mould strains (*Aspergillus flavus*, *A. niger*, *A. parasiticus*, *A. awamori*) were determined as a function of the medium's water activity (a_w) modified with various solutes (NaCl, sucrose, glucose or glycerol). Maltose extract agar was used as the medium. The relationship between water activity and radial growth rate was found to be described by a truncated-bell type curve. It was observed that the relationship between the reciprocal of radial growth rate (defined as radial growth time) and a_w could be described satisfactorily ($P \geq 0.01$) by a second-degree equation. From the 15 equations that interpreted the results obtained with the different *Aspergillus* strains and solutes a simplified relationship was derived that allowed the calculation, for the individual strains, of: 1) lower a_w limit for growth (L_w); 2) optimal a_w value; 3) maximal growth rate. A parameter (W) was also obtained that characterized the osmophily of the strains studied. The relationship which was found to occur between W and L_w values indicates, in accordance with the data of the literature, that moulds are unlikely to grow in media with $a_w \leq 0.61$. AA

- 491 ZETELAKI-HORVATH (K). Possibilities for control of pectolytic enzyme formation by *Aspergillus niger* in continuous culture. *Acta Aliment.* 12(1); 1983; 11-9

Effect of various parameters (dilution rate, pH, carbon source concentration, oxygen transfer rate) was studied on the pectolytic enzyme formation of *Aspergillus niger* in continuous culture, with the main aim to increase the formation of pectin lyase (PL) at the expense of pectin esterase (PE). The increase of the dilution rate from 0.03 h^{-1} to 0.08 h^{-1} , resulted in a very highly significant decrease in the specific PL activity of the culture filtrate (from 1.93 to $1.34 \mu\text{mol min}^{-1} \text{ cm}^{-3}$), while PE activity increased (from 1.56 to $1.93 \text{ mval min}^{-1} \text{ cm}^{-3}$). The increase in the CCS of the diluting medium from 2 to 3% resulted in a very highly significant increase in the specific PL activity of the culture (from 0.45 to $1.18 \mu\text{mol min}^{-1} \text{ cm}^{-3}$), while PE activity showed no remarkable change. According to our results, at an OTR of $34 \text{ mmol l}^{-1} \text{ h}^{-1}$, the specific PE activity proved to be the highest and decreased significantly with the increase in OTR from 34 to $140 \text{ mmol l}^{-1} \text{ h}^{-1}$. The formation of PL was the highest at OTR = 140, significantly higher, than at an OTR value of 34. In the course of this work, apple juice clarifying and macerating effects on the pectolytic enzyme complex of *Aspergillus niger* as well as the activity of end of PG were measured, too. AA

- 492 MILLER (TF) and SRINIVASAN (VR). Production of single-cell protein from cellulose by *Aspergillus terreus*. *Biotechnol. Bioeng.* 25(6); 1983; 1509-79

Cellulose fermentation studies were conducted with a thermotolerant strain of *Aspergillus terreus*. Batch cultivation of *A. terreus* using purified or complex cellulose showed that 80-88% of the available cellulose was utilized in 30-36 hours with an average doubling time of 7.5-8.3 hours. The protein content in the biomass ranged from 23 to 38%. Semicontinuous cultivation studies, in which 90% of the biomass was withdrawn at the end of the growth cycle, indicated that 84% of added cellulose was utilized with the biomass containing 32% crude protein. No loss in cellulose consumption,

growth rate, or protein production occurred through two growth cycles. Continuous cultivation of *A. terreus* showed that 78-84% cellulose consumption occurred over growth temperatures ranging from 35 to 45 C. Maximum specific growth rate (0.14 h^{-1}) occurred at 40 and 45 C with a minimum doubling time of 4.9 hours. AA

MUSHROOM

- 493 IMBERNON (M), BRIAN (C) and GRANIT (S). New strains of *Pleurotus*. Mushroom J. No. 124; 1983; 117, 119, 121, 123

- 494 LLEWELLYN (GC), MARTIN (WA) Jr. and BEAN (GA). Aflatoxin production on two mushroom substrates. J. Food Safety. 5(3); 1983; 113-8

Two fungi, *Boletus edulis* and *Agaricus bisporus*, were tested as substrates for two known aflatoxigenic fungi, *Aspergillus flavus* ATCC 15548 and *A. parasiticus* NRRL, 2999. Both autoclaved substrates supported mycelial growth, sporulation, and aflatoxin production; however, the *B. edulis* substrate allowed more rapid mold growth and greater toxin production than did the *A. bisporus* substrate under laboratory conditions. Both aflatoxins B₁ and AFG₁ were produced with AFG₁ being the predominant toxin. Aflatoxins B₂ and AFG₂ were not detected. Although toxin was produced at low levels, the highest mean being 0.55 µg/g substrate for AFB₁ and AFG₁, both mushrooms apparently contained minimal nutrients for toxigenic mold growth and failed to cause antimycotic or antiaflatoxigenic responses. Routinely used aflatoxin extraction and analytical procedures appear applicable for such testing of mushrooms. AA

- 495 ADSULE (PG), ONKARAYA (H), TEWARI (RP) and GIRIJA (V). Tomato juice as a new canning medium for European mushrooms *Agaricus bisporus* (Lange) Imbach. Mushroom J. No. 124; 1983; 143-5

FOOD ADDITIVES

- 496 MOLLENHAUER (HP). Procedure for approval of additives. Gordian. 83(3); 1983; 42 (German)

- 497 STAFFA (JA). Risk assessment involving a hypothetical indirect food additive. Food Drug. Cosmet. Law J. 38(1); 1983; 48-52

- 498 CASTAGNETTI (P), BARBUTI (S) and CASOLARI (A). Antimicrobial activity of antioxidants. Ind. Conserve. 58(1); 1983; 3-6 (Italian)

The sensitivity of 61 microbial strains to butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT), propyl gallate (PG), octyl gallate (OG) and dodecyl gallate (DG) was determined using culture media. BHA, OG and PG were found to inhibit several of the microorganisms tested. Enterobacteria proved more resistant than gram-positive bacteria and yeasts, *Salmonella typhimurium* became as sensitive as gram-positive bacteria following treatment with 10^{-4} M EDTA. Several gram-positive bacteria were quickly inactivated in physiological salt solution containing 100-200 ppm of BHA. Potassium leakage from the cells of 15 microbial strains treated with 1,000 ppm of antioxidants proved independent of the individual strains. Cells treated with BHA, the most effective of the antioxidants used, did not

release into the supernatant substances absorbing at 260 or 280 nm. Minimal growth temperature for the sensitive bacteria and most of the resistant ones tested increased significantly in media containing BHA. AA

- 499 SANKARAN (R) and LEELA (RK). Effect of preservatives on the germination and growth of thermally injured fungal spores. *Nahrung*. 27(3); 1983; 231-5
 Few strains of fungi isolated from various foodstuffs were investigated for their sensitivity to heat and subsequent tolerance to two preservatives; namely sorbic acid (SA) and butylated hydroxyanisole (BHA). Wide variations in their heat injury and sensitivity to the preservatives were noticed. *Mucor* was most sensitive to BHA, while *Trichoderma* was most tolerant to SA. *Cladosporium*, *Trichoderma* and *Fusarium* were increasingly sensitive to heat. Heat injury also brought about extended lag periods and increased sensitivity to the preservatives. AA

- 500 MANGANELLI (E) and CASOLARI (A). Sensitivity of yeasts to sorbic and benzoic acids and their salts. *Ind. Conserve*. 58(1); 1983; 23-5 (Italian)
 The sensitivity of forty-two yeast cultures to sorbic acid, benzoic acid, potassium sorbate and sodium benzoate was determined. The minimal inhibitory concentration (C_{mi}) was found to be, on an average, lower for potassium sorbate (9.9×10^{-4} M) and benzoic acid (1.37×10^{-3} M). The scattering of C_{mi} values proved lower with potassium sorbate and benzoic acid and higher with sorbic acid and particularly sodium benzoate. For practical purposes, the inhibition of most yeast strains should be attained by using at least 800 ppm of potassium sorbate. AA

- 501 VORHEES (CV.), BUTCHER (RE), BRUNNER (RL) and WOOTTEN (V). Developmental toxicity and psychotoxicity of sodium nitrite in rats. *Food Chem. Toxicol.* 22(1); 1984; 1-6

- 502 CHANG (WH), LUU (HX) and CHENG (AC). A TLC-fluorescent method of detecting and evaluating individual antioxidative components. *J. Food Sci.* 48(2); 1983; 658-9

A new method was developed to detect and to evaluate the amount and/or activity of individual antioxidative components extracted from plant materials or food products. The antioxidative components were separated on a fluorescent TLC plate and visualized by spraying with a tocopherol-stripped soyabean oil solution followed by exposing to UV irradiation in a TLC-viewing UV cabinet. Antioxidative components on the plate appeared after 1-3 hours of UV irradiation as fluorescent spots on a dark background, and their amounts and/or activity can be evaluated from the area and/or the fluorescence/persisting time of the respective spots. AA

- 503 LIN (CCS) and FUNG (DYC). Effect of BHA, BHT, TBHQ and PG on growth and toxigenesis of selected aspergilli. *J. Food Sci.* 48(2); 1983; 576-80

The antifungal effect of butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT), tertiary butylhydroquinone (TBHQ) and propyl gallate (PG) alone or in combination on three toxigenic strains of aspergilli (NRRL 2999, NRRL 4123, NRRL 5835) and three nontoxigenic strains of Aspergilli (NRRL 5521, NRRL 5917, NRRL 5918) was examined in a solid medium and in salami. BHT and PG (0.001, 0.005, 0.01, 0.02 g per plate) did not inhibit growth, sporulation, and toxigenesis of all six cultures. Aflatoxin production by toxigenic aspergilli (B_1 , B_2 , G_1 and G_2) in the presence of BHA, TBHQ, and a combination of BHA and TBHQ was reduced significantly ($P < 0.05$). In salami BHA, TBHQ alone or in combination at 100 ppm significantly ($P < 0.05$) decreased

the aflatoxin production by *Aspergilli* when compared to control samples. A combination of BHA and TBHQ showed synergistic inhibition in both studies (solid medium and salami studies). AA

- 504 FOOD ADDITIVES AND CONTAMINANTS COMMITTEE. Sweetness in food. *Br. Food J.* 85(913); 1983; 37-9

- 505 ANON. The future of acesulfame K. *Food Manuf.* 58(3); 1983; 51-2
Acesulfame K is a sweetener which is about 200 times sweeter than sugar. BSN

- 506 SCHERZ (JC), MONTI (JC) and JOST (R). Analysis of the peptide sweetener aspartame by liquid chromatography. *Z. Lebensmittel-unters.Forsch.* 177(2); 1983; 124-8

- 507 STEPHENS (P). Talin protein - a versatile new ingredient. *Food Flavour. Ingrid. Process. Packag.* 5(3); 1983; 12-3, 15-6

Talin protein is the most potent sweetener which has a sweetness of 2500 times that of sucrose. The article discusses the history of development of talin protein (protein in the fruit of *Thaumatococcus danielli*), as well as its biochemistry, properties, regulatory status and its applications in chewing gum, coffee, soft drinks, as flavouring agent, and in pharmaceuticals. BSN

- 508 KITCHIN (KT) and EBRON (MT). Studies of saccharin and cyclohexylamine in a coupled microsomal activating/embryo culture system. *Food Chem. Toxicol.* 21(5); 1983; 537-41

Rat embryos *in vitro* cultured with 1.0 mM saccharin showed few adverse effects on egg yolk sac growth or embryo growth. When embryos were cultured with cyclohexylamine (CH) and an adult rat hepatic microsomal activating (HMA) system they showed greater retardation of growth than those administered CH alone. In addition, the reduction in egg yolk - sac DNA, embryo DNA, and crown rump length was greater with CH+HMA than with CH alone. Marked changes in the organogenesis of rat were not observable after administration of 1.0 mM saccharin or 0.3 mM cyclohexylamine. JVS

- 509 BEDFORD (JR) and ASHWORTH (DR). Encapsulated flavours. Their applications and development. *Food Flavour. Ingrid. Process. Packag.* 5(2); 1983; 13-5
Discusses: atomisation and drier operation; applications; and advantages. BSN

- 510 BANDYOPADHYAY (C). Contribution of gas chromatography to food flavour research. *Pafai J.* 5(3); 1983; 26-30

Gas chromatography has been considered to be an indispensable tool in flavour research. It is primarily used for the separation and detection of volatile flavour components, which are usually complex organic compounds having a wide range of boiling points and functionality, and are occurring in minute amount in foods. Application of gas chromatography in the analysis of odorous components of mango and onion has been discussed. AA

- 511 STOBBAERTS (RF), VAN HAVERBEKE (L) and HERMAN (MA). Qualitative and quantitative determination of some yellow-orange and red food dyes by resonance Raman spectroscopy. *J. Food Sci.* 48(2); 1983; 521-5

The use of resonance Raman spectroscopy in the determination of food dyes was studied with the yellow, orange and red dyes registered by the

European Economic Community. The natural dyes studied did not exhibit a resonance Raman spectrum, but most of the artificial dyes give spectra that can be used for analytical determinations. The detection and identification limits are sufficiently low for practical use. The identification capability and its advantage over absorption spectrometric measurements are demonstrated on a commercial bubble gum sample. Quantitative measurements indicated a good accuracy for this method. AA

- 512 SENO (M), FUKUDA (S) and UMISA (H). A teratogenicity study of phloxine B in KR mice. *Food Chem. Toxicol.* 22(1); 1984; 55-60

Phloxine B is a chemical dye of acid xanthene group which is permitted for use in foods in a few countries. This study indicated that phloxine B was teratogenic in mice at dietary levels of 3 and 5% at these levels maternal toxicity was noticed. Another finding was the occurrence of teratogenicity (split cervical arches) at 1% dose level. JVS

- 513 PUTTEMANS (ML), DRYON (L) and MASSART (DL). High performance liquid chromatographic and colorimetric determination of synthetic dyes in gelatin-containing sweets following polymide adsorption and ion-pair extraction with tri-n-octylamine. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 1039-44

The gelatin must be eliminated first because, it interferes with the normal ion-pair extraction of dyes with tri-n-octylamine to chloroform. Techniques such as precipitation of gelatin with organic solvents, and acid and enzymatic digestion of gelatin are shown to be unsuccessful because the remaining gelatin still influences the extraction scheme. Positive results are obtained when dyes are adsorbed on polyamide, gelatin is washed away, and dyes are desorbed with a methanol-ammonia mixture. Dyes are identified by thin layer chromatography and high performance liquid chromatography (HPLC), and quantitated by HPLC or colorimetry. AA

- 514 KATZ (AC), FRANK (DW), SAUERHOFF (MW), ZWICKER (GM) and FREUDENTHAL (RI). A 6-month dietary toxicity study of acidic sodium aluminium phosphate in beagle dogs. *Food Chem. Toxicol.* 22(1); 1984; 7-9

Sodium aluminium phosphate (SALP) (used as a commercial leavening agent) is on the FDA list of food ingredients that are classified as GRAS. Describes the report of a study for over 6 months in beagle dogs fed SALP at 0.3, 1.0 and 3.0% levels. No adverse clinical signs were noticeable. Experimental observations on food consumption, organ weights, blood chemistry, urinalysis and histopathology have been discussed. Thus dietary administration of sodium aluminium phosphate for 6 months at concentrations of 3% or lower caused no significant toxicological effects in beagle dogs. JVS

- 515 SUGGS (JL). The benefits of powdered emulsifiers. *Cereal Food World.* 28(12); 1983; 715-6

- 516 RAY (AK), JOHNSON (JK) and SULLIVAN (RJ). Refractive index of the dispersed phase in oil-in-water emulsions: Its dependence on droplet size and aging. *J. Food Sci.* 48(2); 1983; 513-6

- 517 MOSANDL (A). On synthetic aroma substances III. Diastereomeric and enantiomeric esters of 3-methyl-3-phenyl glycidic acid. *Z. Lebensmittel Unters. Forsch.* 177(2); 1983; 129-34 (German)

CEREALS

- 518 THIRTY-THIRD CONVENTION ON CEREAL CHEMISTRY, 12-14 May 1982, Detmold. (Cereal Research Work Group and Federal Research Institute for Cereal and Potato Processing, Detmold). *Dtsch. Lebensmittel Rundschau*. 79(2); 1983; 55-9 (German)

Abstracts of the following papers have been presented: KLUVER (M) - Information and documentation in the field of cereal processing, using national and international data bases. GUNZEL (G) - Quality of bread wheats, and its realization by breeding. STEVENS (DJ) and EVERS (AD) - The mechanism and significance of starch damage. SPICHER (G) - Current microbiological problems in cereal processing. OCKER (HD) - Pesticides in cereals - Present state of knowledge and gaps existing in it. WIESER (H), ASHKENAZI (A) and BELITZ (H-D) - Inter-relationships between the structure of cereal proteins and coeliac disease. MEUSER (F) and SCHILLING (M) - Influence of processing on the mineral content of cereals. NGUYEN-BREM (T), KIEFER (R) and GROSCH (W) - Influence of additives used in dough preparation on the molecular weight and fatty acid composition of wheat gluten fractions. MENGER (A) - Types of sugar and high-molecular decomposition products of starch in breads. NIERLE (D) - Possible applications of capillary isotachophoresis in cereal analysis. BRUGGEMANN (J), OCKER (H-D) and ZWINGELBERG (H) - Carry-over of heavy metals to wheat milling fractions. BUSHUK (W), KANAN (K) and McMASTERS (GJ) - Glutenin: The key to baking quality of wheat flour. GRAVELAND (A) - Analysis and functional properties of cereal proteins. KEMPF (W) - Some current problems of potato processing, with industrial starch manufacture as an example. RYNJA (R) and SPARENBERG (H) - Post-harvest technology for avoidance of losses - A comparison between cereals and potatoes. POMERANZ (Y) - Flour fractions and baking behaviour. LINKO (P) - HTST-extruder as a biochemical reactor. SEIBEL (W) - Optimization of quality of baked goods. BOLLING (H) - Milling technology - Developments in raw material quality and techniques. FRETZDORFF (B), POMERANZ (Y) and BECHTEL (DB) - Fine structure of wheat flour dough and bread. KMD

- 519 WOLFF (J), NIERLE (W), EL-BAYA (AW) and FRETZDORFF (B). Comparative investigations on the composition of breakfast cereals. *Getreide Mehl Brot*. 37(1); 1983; 13-17 (German)

Eighteen different breakfast cereals - based on oats, rice, maize, wheat, and musli - have been analyzed for their fat, protein, amino acid and carbohydrate contents. The results have been discussed in some detail, from the nutritional point of view, with special attention to : (i) the relation between phytic acid and crude fibre content; and (ii) the consequences of excessive addition of sucrose (between 10 and 40%). KMD

- 520 NYMAN (M), SILJESTROM (M), PEDERSEN (B), BACHKNUDSEN (KE), ASP (N-G), JOHANSSON (C-G) and EGGUM (BO). Dietary fiber content and composition in six cereals at different extraction rates. *Cereal Chem*. 61(1); 1984; 14-9

An enzymatic method was used to examine the relationship between extraction rate and dietary-fibre content in flours from wheat, rye, barley, sorghum, rice and corn. Results were compared with neutral-detergent, acid-detergent, and crude-fiber determinations. Dietary-fiber content in wheat was constant for extraction rates between 65 and 80%, and then increased linearly with the extraction rate. Dietary fiber content in rice and to some extent in barley had a similar relationship, whereas in rye and sorghum it increased gradually with the extraction rate. Soluble dietary-fiber content was constant in each cereal, regardless of the extraction rate, and constituted almost half of the

dietary fiber in wheat, rye, and barley flours of low extraction rate. The relative monomeric composition of the dietary fiber in wheat, rye, and corn was similar at the highest and the lowest rates of extractions, with xylose-arabinose ratios being 0.9-1.5. In barley and rice, the relative xylose content increased with the rate of extraction, whereas in sorghum, both arabinose and xylose content increased. Acid-detergent and crude fiber comprised only a fraction of insoluble and of total dietary fiber. The slope of the regression equation between insoluble dietary fiber and neutral-detergent fiber amylase was 0.8-1.0 for wheat, rye, barley, and rice and 1.2 for corn. Detergent methods applied to sorghum gave obscure results. AA

- 521 WIESER (H), SEILMEIER (W) and BELITZ (H-D). Comparative investigations of partial amino-acid sequences of prolamines and glutelins from cereals. V. Cation exchange chromatography of the peptide fractions 1-3 obtained by gel chromatography. *Z. Lebensmittel Unters. Forsch.* 177(2); 1983; 101-8 (German)

- 522 OCKER (H-D). Toxic substances in cereals - Present status of knowledge and ignorance. *Getreide Mehl Brot.* 37(1); 1983; 3-7 (German)

Analytical results indicate that the content of contaminants like, organic halogen compounds (e.g. DDT) in cereals and cereal products have been stagnating, or even decreasing, in recent years, while the contents of polycyclic biphenyls, polycyclic aromatic hydrocarbons, and toxic heavy metals like lead, mercury, and cadmium have obviously not risen. However, it is necessary to continue with the monitoring of the content of cadmium, growth regulators, and new physiologically active agents. KMD

- 523 GOLINSKI (P), CHELKOWSKI (J), KONARKOWSKI (A) and SZEBIOTKO (K). Mycotoxins in cereal grains. VI. The effect of ochratoxin A on growth and tissue residues of the mycotoxin in broiler chickens. *Nahrung.* 27(3); 1983; 251-6

Ochratoxin A was fed at 5 different levels (0, 0.5, 1.0, 1.5 and 2.0 mg per kg feed) to broiler chickens of both sexes, over a period of 8 weeks. No mortality and no changes in the liver or kidneys could be observed. The loss of body weight was greater in males (30%) than in females (20%), and was proportional to the amount of toxin fed through the diet. The toxin was found in the livers and white muscle in birds fed doses ≥ 1.0 mg/kg, and in red muscle when the birds were fed doses ≥ 1.5 mg/kg. Ochratoxin A disappeared from all the tissues after the birds had been fed on a toxin-free diet for 4 days. KMD

- 524 SIETZ (W). Computer evaluation of dough-rheological tests. *Getreide Mehl Brot.* 37(2); 1983; 39-43 (German)

Use of a computer for the evaluation of the data produced by rheological tests on dough can reduce errors completely. A computer installation using 5 calculators (Type Apple II) has been set up in a mill laboratory, and its advantages in research and day-to-day practice explained. KMD

- 525 SPICHER (G) and MELLENTIN (B). Microbiological quality of cereal wholemeal products. Part 3. Yeasts occurring in table cereals and flours. *Dtsch. Lebensmittel-Rundschau.* 79(2); 1983; 35-8 (German)

The content of yeast germs in cereals and milled cereal products varies widely, from a small number to as much as 9×10^4 per g of cereal, or 1.9×10^3 per g of flour. Yeasts of ten different genera have been found, but the main ones are *Cryptococcus*, *Pichia*, *Rhodotorula*, *Torulopsis*, and *Trichosporon*. Out of 113 yeast strains obtained from 13 table ryes and wheats and from 9 rye

and wheat flours, as many as 101 belonged to just 5 species, viz: *Trichosporon cutaneum* (37 isolates), *Torulopsis ingeniosa* (21 isolates), *Cryptococcus albidus* (17 isolates), *Pichia membranaefaciens* (14 isolates), and *Rhodotorula glutinis* (12 isolates). KMD

RICE

- 526 NGUYEN (CN) and KUNZE (OR). Fissures related to post-drying treatments in rough rice. *Cereal Chem.* 61(1); 1984; 63-8

Rapid drying of field rice would be practical if a treatment could be devised that would inhibit the post-drying fissures that develop in the grain. Investigations were conducted on breaking strengths and on percentage of fissured grains that developed in rough rice stored in different environments after being subjected to drying temperatures of 25, 40, and 60 C. Breaking strengths were generally related to the percentage of grains that had fissured in the treated samples. A storage environment of 11% rh, 45 C produced the lowest percentage of fissured grains, whereas a storage environment of 75% rh, 10 C produced the highest percentage. The storage temperature of 10 C consistently produced more fissured grains in the Brazos variety than did the 45 C temperature, but results of the two storage temperatures were variable for the Labelle variety. AA

- 527 SUAREZ (C), AGUERRE (R) and VIOLLAZ (PE). Analysis of desorption isotherms of rough rice. *Food Sci. + Technol.* 16(3); 1983; 176-9

Desorption data of rough rice, in the temperature range 10-70 C, as reported in the literature, were analyzed. The heat of desorption and monolayer moisture content were calculated; the values for $(E_1 - E_L)$ and the factor $K = a_1 b_2 / b_1 a_2$ were evaluated independently from the plot of $\ln C$ vs. $1/T$, and from these values the constant, C , of the B.E.T. theory was calculated. The value of K was very different from 1; hence, the single isotherm method of determining the heat of desorption cannot be used for rough rice. Subsequently, a method for calculation of the molar heat of desorption, within the scope of the B.E.T. theory, was developed, and the results were compared with the Clausius-Clapeyron heat. It was found that this method takes into account the dependence of monolayer moisture on temperature, and there is satisfactory agreement between the predicted heat and the Clausius-Clapeyron heat. KMD

- 528 TAKAHASHI (H), YASAKI (H), NANAYAMA (U), MANABE (M) and MATSUURA (S). Distribution of sterigmatocystin and fungal mycelium in individual brown rice kernels naturally infected by *Aspergillus versicolor*. *Cereal Chem.* 61(1); 1984; 48-52

The distribution of fungal mycelium and the mycotoxin sterigmatocystin in individual brown rice kernels naturally infected by *Aspergillus versicolor* was studied with scanning electron and fluorescence microscopy. Mycotoxin content in the milled rice or rice bran at various milling stages was determined by fluorodensitometry. Scanning electron microscopy showed that invading mycelia were often in the adjacent germ, aleurone layer, or starchy endosperm. The fungus usually occurred around germ as an entangled mycelial mass, but it was rarely found in the major part of the endosperm unless the grain was cracked. Characteristic yellow fluorescence caused by the mycotoxin was found in the germ, aleurone layer, and starchy endosperm adjacent to them, and conspicuously around the germ. Concentrations of mycotoxin in brown rice were 3.8-4.3 ppm. Mycotoxin content in milled rice decreased gradually from 71.6 to 7.7%, depending on the milling yields from 97.7 to 56.4%. The major portion of mycotoxin produced in brown rice could be removed at the milling yield (56.4%).

TRITICALE

- 529 SEHGAL (KL), BAJAJ (S) and SEKHON (KS). Studies on the composition, quality and processing of *triticale*. Part I. Physico-chemical characteristics. *Nahrung*. 27(1); 1983; 31-7

Studies on the physico-chemical characteristics of 14 promising strains of *triticale* and two check wheat varieties (Kalyansona and WL 711) grown under similar agronomic conditions were conducted. Significant differences were obtained for 1000 kernel weight ranging from 34.9 to 51.8 g, hectolitre weight ranging from 64.7 to 73.5 kg and pearling index depicting grain hardness varying significantly from 22.3 to 39.9%. Higher contents of protein (13.1%), ash (1.83%), lipids (2.65%), crude fibre (2.37%), energy value (1486 KJ/100 g), diastatic activity (283 mg maltose/10 g flour), reducing sugars (65.6 mg maltose/10 g) and non-reducing sugars (244 mg maltose/10 g) were observed in *triticale* than those in wheat. Low values of Pelshenke and sedimentation tests indicated poor gluten quality in *triticale*. AA

- 530 SEHGAL (KL), BAJAJ (S) and SEKHON (KS). Studies on the composition, quality and processing of *triticale*. Part II. Mineral composition of grain and flour. *Nahrung*. 27(1); 1983; 39-44

Mineral composition of grain and flour in 14 promising *triticale* strains from India are reported. The mean values for whole grain, i.e. Ca (0.47 mg/g), P (2.70 mg/g), K 4.60 mg/g, Na (352 µg/g), Zn (41.6 µg/g), Cu (7.0 µg/g), Fe (73.4 µg/g) and Mn (33.6 µg/g) were obtained as compared to those of flour, i.e. Ca (0.27 mg/g), P (0.97 mg/g), K (1.64 mg/g), Na (231 µg/g), Zn (26 µg/g), Cu (4.0 µg/g), Fe (42 µg/g) and Mn (10.5 µg/g), respectively. These values were found to be considerably higher than those of wheat. Highly significant positive correlations of ash with sodium and zinc in whole grain were observed. In the case of *triticale* flour, highly significant positive correlations of ash with manganese, phosphorus and potassium were obtained. AA

- 531 NEHEZ (R), PALVOLGYI (L) and BEKE (B). Some aspects of the application of gliadin gel electrophoretic pattern and phenol colour reaction in the identification and breeding of wheat varieties. *Acta Aliment.* 12(2); 1983; 131-41

- 532 PRESTON (KR). Gel filtration and characterization of neutral salt extracted wheat gluten proteins varying in hydrophobic properties. *Cereal Chem.* 61(1); 1984; 76-82

Defatted gluten proteins, extracted separately with various concentrations of simple monovalent sodium salts of the lyotropic series (F, Cl, Br, ClO₄, I, SCN) were fractionated by gel filtration on Sephacryl S-300. Four fractions with apparent average molecular weights greater than 300,000, 38,000, 18,000, and 14,500, as well as a low molecular weight fraction, were characterized by electrophoresis and amino acid analysis. Large differences in both the quantitative and qualitative properties of the extracts due to anion type and concentration were obtained. With 1.0 M nonchaotropic salts, low molecular weight gliadin like proteins and high molecular weight gluten proteins with high charge densities were extracted, indicating that these fractions had a low tendency to interact hydrophobically. As the chaotropic nature of the salts was increased, the 38,000 molecular weight gluten fraction with gliadin like properties became extractable, suggesting that this fraction had a strong tendency to undergo interprotein hydrophobic interactions. High concentrations of the most chaotropic salt, NaSCN, were required

to extract the gluteninlike high molecular weight fraction, indicating a very strong tendency to interact hydrophobically. AA

- 533 NGUYEN-BREM (PT), KIEFFER (R) and GROSCH (W). Influence of additives used during dough preparation on the molecular weight and fatty acid composition of the gluten fractions of wheat. *Getreide Mehl Brot.* 37(2); 1983; 35-9

During the period of dough rest, the high-molecular proteins (Fraction I) decrease. This change is delayed by ascorbic acid, soya-lipoxygenase (LOX-2), lipase, azodicarbonamide, and N-ethyl maleinimide. Cysteine and glutathione had no such effect. Gluten contains about 24% of the fatty acids present in dough - about 18% in Fraction I and 5.5% in Fraction II. Cysteine, glutathione, azodicarbonimide, and N-ethyl-maleinimide have no effect on the amount or composition of fatty acids. KMD

- 534 EL-SHAFEI (MM), KAMAL (MAM), ABBASSI (MH) and SAID (AK). The effect of baking on availability of essential amino acids in wheat. *Nahrung.* 27(1); 1983; 45-53

Lysine availability in wheat flour and bread was determined by the growth response method on rats, using regression analysis relating (a) the gain in body weight, and (b) the gain in body water, to the amount of lysine consumed at two levels of extraction (87% and 72%). Availability of N and of amino acids were also determined by the balance trials method (faecal analysis method). Baking increases lysine availability on the basis of body water gain. The lysine in wheat flour and bread of 72% extraction was more available than in flour and bread of 87% extraction. The balance trials showed that neither extraction nor baking had any significant effect on availability of amino acids. A fairly good correlation was obtained for wheat flour and bread at the two levels of extraction. The nutritive value of wheat, when judged by change in weight, food efficiency, PER, NPR, and true digestibility, is not significantly affected either by baking or by level of extraction of the flour. KMD

- 535 WHITE (GG). A modified inclined sieve for separation of insects from wheat. *J. Stored Prod. Res.* 19(2); 1983; 89-91

An inclined sieve suitable for handling large samples of grain by one person has been developed by modification of the bag sieve used in Africa. The sieve, fabricated in aluminium, is described and its efficiency in recovering adult insects from wheat reported. Recovery of about 90% of *Tribolium castaneum* and *Rhyzopertha dominica* from 30 kg samples of wheat was achieved in 4-5 minutes, but recovery of *Sitophilus oryzae* was lower. AA

- 536 BHAT (RV), BAPU RAO (S), ROY (DN), MALINI VIJAYARAGHAVAN and TULPULE (PG). Toxicological evaluation of karnal bunt wheat. *J. Food Safety.* 5(3); 1983; 105-11

Toxicological evaluation of Karnal bunt wheat was carried out in monkeys, feeding on a diet containing 70% karnal bunt wheat, for 12 weeks. Blood was drawn once every two weeks. In addition to hematological parameters, total protein, albumin, alkaline phosphatase and transaminases were estimated in serum. The results of the study did not indicate any adverse effect in monkeys on consumption of up to 70% Karnal bunt affected wheat. AA

- 537 SAGI (F), SAGI (H) and ACS (E). Alkylresorcinols in durum wheat. II. Alkylresorcinol content of milling fractions and macaroni. *Acta Aliment.* 12(2); 1983; 143-8

Seed samples of three durum wheat varieties were milled in a commercial

mill. The bran, semolina and flour fractions, as well as the macaroni produced from the semolina, were examined for 5-alkylresorcinol (5-AR) content. Bran contained the highest amount of 5-AR (2200 to 2600 ppm on a dry weight basis), followed by flour (200 to 250 ppm), semolina (70 to 90 ppm), and macaroni (≤ 50 ppm), respectively. The 5-AR content of the bran varied most, probably due to the joint effect of variety and milling. The very low 5-AR content of macaroni may be attributed to processing and prolonged wet drying. There was a negative correlation between pasta brownness and kernel 5-AR content, suggesting that alkylresorcinols may inhibit the browning reactions mediated by peroxidase and polyphenoloxidase. The yellow index and 5-AR content were not correlated with each other. AA

- 538 DAVIS (AB) and LAI (CS). Microwave utilization in the rapid determination of flour moisture. *Cereal Chem.* 61(1); 1984; 1-4

A microwave-oven moisture-determination system was compared with a standard air-oven method for determination of moisture in hard, soft, and whole wheat flours. Sample size, drying time, and microwave energy level were optimized for each flour to produce the greatest moisture removal possible without charring of the sample. After optimization, the microwave method was compared with a standard air-oven method for each type of flour over a normal range of moistures. Results indicate that the microwave system gives a slightly, but consistently lower, value for moisture when compared to the air-oven method. The degree of difference is on the order of 0.5%, and is sufficiently consistent to allow a tabular correction to agree with air-oven values. Thus, it appears that the microwave system may provide a rapid method for moisture determination in flour. AA

- 539 FRETZDORFF (B), BECHTEL (DB) and POMERANZ (Y). Fine structure of wheat flour dough and bread. *Getreide Mehl Brot.* 37(2); 1983; 43-5 (German)

The freeze-fracture process has been employed to study the fine structure of wheat flour doughs and bread, under the electron microscope. The photographs revealed the presence of both small and large starch granules, as well as the distribution of water, and starch-protein interactions. Water was present in three forms: (i) as a sheath around starch granules and yeast cells; (ii) drops; (iii) large accumulations of water. Protein was present in the form of a network in flour-water doughs, and assumed a flatter structure when additives were included in the finished dough. A transitional structure was noticed after addition of sugar. KMD

- 540 ZIMMERMANN (R), MIETH (G) and BRUCKNER (J). On functional properties of sunflower proteins in wheat dough and bread. Part I. The effects of diverse methods of protein isolation. *Nahrung.* 27(1); 1983; 95-102 (German)

The authors studied the effects of protein preparations obtained from sunflower seed (meals, concentrates, isolates) by diverse methods on wheat dough making and on the volumes of the baked goods. Depending upon the kind and the concentration of the test preparation, there were characteristic changes in the valorigraphic course of dough making, increased uptake of water and dough softening as well as a decrease in the elasticity and volume of the dough and in the volume of the baked good being demonstrated. AA

- 541 POMERANZ (Y), MEYER (D) and SEIBEL (W). Wheat, wheat-rye and rye dough and bread studied by scanning electron microscopy. *Cereal Chem.* 61(1); 1984; 53-9

OAT

- 542 WOOD (PJ) and WEISZ (J). Use of calcofluor in analysis of oat beta-D-glucan. *Cereal Chem.* 61(1); 1984; 73-5

Addition of the fluorescent whitening agent Calcofluor to solutions of partially purified oat (1→3) (1→4)-β-D-glucan gave precipitates that, on acid hydrolysis and high performance liquid chromatography, showed glucose as the only monosaccharide present. Solutions obtained by extraction of oat flour with carbonate buffer at pH 10 also gave precipitates in the presence of Calcofluor. The β-D-glucan determined by analysis of the material precipitated by Calcofluor was in good agreement with the values obtained from the difference between total glucan and α-glucan. AA

MILLETS

PEARL MILLET

- 543 OLEWNIK (MC), HOSENEY (RC) and VARRIANO-MARSTON (E). A procedure to produce pearl millet *Rotis*. *Cereal Chem.* 61(1); 1984; 28-33

A laboratory procedure for preparing pearl millet *rotis* was developed. Finely ground meals produced better *rotis* than coarsely ground meals. Water absorption was critical. If the meal was finely ground and optimum absorption was used, all cultivars tested produced good *rotis*. Instron stress-relaxation curves were used to predict optimum absorption. Our data indicated that *roti* doughs are simple powder-water systems, and that cohesion is produced by water holding the powder particles together with capillary-type forces. AA

SORGHUM

- 544 WILLS (RBH) and ALI (MR). Effect of grain size on degree of milling, colour and cooking time of sorghum. *J. Food Sci.* 48(2); 1983; 650-51

Sixteen coloured and white hybrid sorghum cultivars were size-graded and the three major sizes, 4.00-4.74 mm, 3.35-3.99 mm and 2.80-3.34 mm, dehulled for 60 seconds. Within a cultivar the degree of milling (loss of unbroken kernel during milling) varied between individual sizes and was lower for the smaller grain. The pericarp content increased 2.80 > 4.00 > 3.35 mm + grain. The colour of ground pearled grain of 4.00 mm + and 3.35 mm + sizes was similar to that of white cultivars, but 2.80 mm + grain had a higher colour absorption due to some residual pericarp. The cooking time ranged from 54 minutes to 64 minutes and was shorter for the smaller grain. AA

- 545 TAYLOR (JRN), NOVELLIE (L) and LIEBENBERG (NvdW). Sorghum protein body composition and ultrastructure. *Cereal Chem.* 61(1); 1984; 69-73

The protein composition and ultrastructure of sorghum protein bodies isolated from mature starchy endosperm material were studied. Transmission electron microscopy showed that the protein bodies were largely circular in section and varied between 0.4 and 2.0 μm across. The isolated protein bodies were subjected to an Osborne-type protein/fractionation procedure, which revealed that they are composed mainly of prolamin protein. Protein body prolamin had a virtually identical amino acid composition and gave the same electrophoretic pattern as kafirin (sorghum prolamin). This proves that

starchy endosperm protein bodies are the site of kafirin storage in sorghum, as was suggested by electron microscope observations. The protein bodies were embedded in and, in some cases, penetrated by a matrix of mainly glutelin protein. This matrix protein consisted of many proteins, none of which predominated. Maltase activity was associated with the protein, and the matrix may function as a source of certain hydrolytic enzymes involved in the mobilization of endosperm reserves during germination. AA

MAIZE

- 546 PEPLINSKI (AJ), ANDERSON (RA) and ALAKSIEWICZ (FB). Corn dry-milling studies: Shortening mill flow and reduced temper time and moisture. *Cereal Chem.* 61(1); 1984; 60-62

Experimental dry-milling studies on corn were conducted to establish a shortened mill flow that would reduce the number of operations in the milling process and provide raw materials for possible production of alcohol and/or starch. Results indicated that low-fat grits could be produced without going through the elaborate tempering and roller-milling procedures now used. Reducing corn temper moisture and temper time prior to degerming was shown to be feasible for production of low-fat grits, but the attached hull content was markedly increased when these conditions were used. AA

- 547 BIANCHI (G), AVATO (P) and SALAMINI (F). Surface waxes from grain, leaves, and husks of maize (*Zea mays* L.). *Cereal Chem.* 61(1); 1984; 45-7

- 548 AYATSE (JO), EKA (OU) and IFON (ET). Chemical evaluation of the effect of roasting on the nutritive value of maize (*Zea mays* L.). *Food Chem.* 12(2); 1983; 135-47

This study reports on the effects of roasting on the chemical composition of maize (*Zea mays*). Proximate analysis showed no significant difference ($p > 0.05$) between raw and roasted maize in ether extract, crude protein, crude fibre, ash and carbohydrate content; except moisture content ($p < 0.05$), which showed a 42.3% decrease. Elemental composition analysis showed decreases of potassium (13.8%) and calcium (41.1%). Significant differences ($p < 0.05$) were observed for vitamins B₁, B₂ and C contents with 26.8%, 32.4% and 35.1% destruction, respectively. Amino acid analysis showed losses for lysine (26.7%), iso-leucine (20.8%) and leucine (23.4%). There was significant ($p < 0.05$) variation in phytic acid, oxalic acid, tannin and hydrocyanic acid with reductions of 15.4%, 6.02%, 51.3% and 34.6% respectively. The effect of these changes on the nutritive value of roasted maize is discussed. AA

- 549 GOMEZ (MH) and AGUILERA (JM). Changes in the starch fraction during extrusion-cooking of corn. *J. Food Sci.* 48(2); 1983; 378-81

Whole ground corn was extruded at 23.7, 18.5, 15.4, 13.9 and 7.6% moisture contents (EMC). Decreasing EMC resulted in increases in water solubility index (WSI), enzyme susceptibility (ES), degree of gelatinization and blue values, while water absorption index and water insoluble carbohydrates decreased. ES and WSI of several blends prepared by combining raw (R), gelatinized (G), and dextrinized (D) corn were compared to those of extruded products. Corn extrudates had properties similar to blends containing G and D corn only. The relative proportion of D corn increased from about 10 to 60%, as EMC decreased. "Dextrinization" appears to become the predominant mechanism of starch degradation during low-moisture, high-shear extrusion. Viscoamylographs, scanning electron and light photomicrographs support these findings. AA

- 550 de PADUA (MR) and PADUA MAROUN (H). Rheological behaviour of Venezuelan Arepa dough from precooked corn flour. *Cereal Chem.* 61(1); 1984; 37-41

Arepa, a traditional Venezuelan dish, is usually prepared from pre-cooked corn flour. When mixed with water, the flour results in an adhesive dough. Effects of several variables on the adhesiveness of arepa dough were evaluated. When cooked, this dough becomes elastic. The effect of increased cooking time on the rheological, chemical, and physical properties of the dough was evaluated. Adhesiveness of the dough decreased with increasing rest time and with increased dough water level, and it increased with increased mix time. The relationship between particle size, adhesiveness, water absorption, consistency, and apparent viscosity of the dough was established. Rigidity and hydration capacity increased, and amylograph viscosity at 95 C decreased with increased cooking time. No effect on the susceptibility of the starch to enzyme attack was shown. AA

BARLEY

- 551 JUHANI HAKKARAINEN (RV), TYOPPONEN (JT) and GOSTA BENGTSSON (S). Changes in the content and composition of vitamin E in damp barley stored in air tight bins. *J. Sci. Food Agric.* 34(10); 1983; 1029-38

PULSES

- 552 HSU (KH). A diffusion model with a concentration-dependent diffusion coefficient for describing water movement in legumes during soaking. *J. Food Sci.* 48(2); 1983; 618-22, 645

A mathematical model based on Fick's diffusion equation with a concentration-dependent diffusion coefficient was proposed to describe the absorption of water by legumes. The equation was solved by using a numerical scheme. Parameter study was performed. The model is capable of predicting sigmoidal-shaped water uptake curves common to many legumes. Differences are discussed between the surface resistance boundary condition used in this study and the radiation boundary condition widely used for dehydration calculations. The validity of using the proposed model to described the water uptake of legumes was verified by the good fit between the experimental and theoretical curves. AA

- 553 JONES (PMB) and BOULTER (D). The cause of reduced cooking rate in *Phaseolus vulgaris* following adverse storage conditions. *J. Food Sci.* 48(2); 1983; 623-6, 649

The interrelationship between reduced cell separation rate, reduced imbibition value and reduced pectin solubility was investigated with reference to reduced cooking rate in *Phaseolus vulgaris* also termed the hardbean phenomenon. It was found that reduced imbibition value and reduced pectin solubility can both cause a reduction in the rate of cell separation during cooking of beans and hence an increase in their cooking time and that these two factors act synergistically. Accompanying symptoms are solute leakage during soaking due to membrane breakdown, phytin catabolism and pectin demethylation, all of which are key factors in the development of hardbean. AA

- 554 NORBERG (P) and AKERSTRAND (K). Microbiological aspects on bean sprouting. *Var Foda*. 35(1); 1983; 20-27 (Swedish)

When beans are sprouted at 37 C - whether at home or commercially - there is a rapid growth of bacteria; the aerobic plate count and coliforms often exceed 10^7 - 10^8 per g, within 1-2 days. The dominant species are *Klebsiella pneumoniae* and *Erwinia herbicola*. Four isolates *K. pneumoniae* were tested for their ability to produce enterotoxin: all proved to be negative. The numbers of bacteria could not be decreased either by pasteurizing the seeds at 60 C for 30 seconds, or by chlorinating them in 0.3% chlorine for 2 minutes. When mung beans were allowed to sprout at 30 C, without rinsing for 7 days, a sparse growths of *Aspergillus flavus* was observed, but no aflatoxin was found. However, in samples inoculated with *A. flavus*, 0.05 mg aflatoxin (B_1 and B_2) were found in 1 kg after 7 days. KMD

PEA

- 555 McCURDY (SM), DRAKE (SR), SWANSON (BG), LEUNG (HK) and POWERS (JR). Influence of cultivar, soak solution, blanch method, and brine composition on canned dry pea quality. *J. Food Sci.* 48(2); 1983; 394-9

The composition of two commercially grown cultivars of dry peas (*Pisum sativum* L.), 'Alaska' and 'Garfield', and their physical and sensory qualities after rehydration and thermal processing under various conditions were evaluated. Raw Garfield peas were larger and higher in lipid content ($P < 0.05$) than Alaska peas, but no differences between cultivars were observed for moisture protein, fiber, insoluble solids, alcohol insoluble solids, or starch contents. Sensory and physical assessment of the pea cultivars when canned revealed differences for a number of variables, but the results were complicated by interaction with the variety of processing conditions employed. The data indicate that appropriate control of processing conditions can minimize the difference in sensory characteristics among peas of different cultivars. AA

- 556 GEBRE-EGZIABHER (A) and SUMNER (AK). Preparation of high protein curd from field peas. *J. Food Sci.* 48(2); 1983; 375-7, 388

Field peas were investigated as an alternative to soyabeans to produce a high protein curd which resembles tofu. Yield, texture, colour, proximate composition and sensory evaluation of both curds were compared. The yields of total curd from pea flour and soyabeans were 13.6% and 39.8% respectively with protein yields of 43.0% and 55.5%. Amino acid composition of the pea curd compared quite closely to that of the soyabean curd. Addition of gluten improved the sulphur amino acid profile but reduced the lysine content. Flavour of the pea and soyabean curds was rated similar but texture and colour of the pea curd was scored lower ($p < 0.05$). Gluten modified the texture and the colour of the curds. AA

COWPEA

- 557 ETOKAKPAN (OU), EKA (OU) and IFON (ET). Chemical evaluation of the effect of pest infestation on the nutritive value of cowpeas *Vigna unguiculata*. *Food Chem.* 12(3); 1983; 149-57

There was increase in ash, crude protein and crude fibre content with infestation. The levels of aspartic acid, threonine, serine, alanine, cysteine and isoleucine were not much affected by the infestation where as marked

reduction in levels of lysine, glutamic acid, glycine, valine methionine and leucine was observed. Only arginine showed an increase with infestation. All the vitamins assayed showed decrease in levels with infestation. Toxic substances such as phytic acid, oxalates and tannins were higher in the infested cowpeas than in the uninfested. Hydrocyanic acid decreased with infestation. KAR

FABABEAN

- 558 SCHWENKE (KD), PRAHL (L), RAAB (B), ROBOWSKY (K-D), DABROWSKI (K), KOCON (J) and RUTKOWSKI (A). Functional properties of plant proteins. Part 3. Influence of denaturing processing conditions on the properties of protein isolates from fababeans (*Vicia faba* L.). *Nahrung*. 27(1); 1983; 79-93 (German)
- 559 PROLL (J) and SCHWENKE (KD). Chemical modification of proteins. 9. Nutritive evaluation of succinylated fababean proteins (*Vicia faba* L.). *Nahrung*. 27(3); 1983; K9-K11

While lysine having an acetylated ϵ -amino group is at least partially utilized by the human organisms (because of the presence of acylase in the kidneys), succinylated lysine is absorbed but again excreted in the urine without being utilized. Therefore, a completely succinylated protein must be regarded as a lysine-free protein for animal organisms. KMD

FIELD BEAN

- 560 NOTZOLD (H), SCHAFER (H) and LUDWIG (E). On the potentiometric titration of fieldbean protein isolate and plastein produced from it. *Nahrung*. 27(1); 1983; 71-78 (German)

LENTIL

- 561 WEDER (JKP), HEGARTY (MP), HOLZNER (M) and KERN-DIRNDORFER (M-L). Trypsin and chymotrypsin inhibitors in leguminosae. VIII. Isolation and some properties of the principal inhibitor from lentils (*Lens culinaris* Medik). 7. *Lebensmittel-Unters Forsch*. 177(2); 1983; 109-13

LUPINE

- 562 BALLESTER (DR), BRUNSER (O), SAI TUA (MT), EGANA (JI), YANEZ (EO) and OWEN (DF). Safety evaluation of sweet lupine (*Lupinus albus* cv. Multolupa). II. Nine-month feeding and multigeneration study in rats. *Food Chem. Toxicol*. 22(1); 1984; 45-8

Sweet lupine with a low alkaloid content is a potential source of calories and proteins for humans. This paper reports the results of a study of first and second generations and as a reproduction study of rats maintained on similar diets as those given to parent generations. Results on mortality, behaviour, growth rate, haematology, vital organ changes and histology have been discussed. The study did not indicate any deleterious effects through two generations of rats fed sweet lupine at 20% dietary protein level for nine months. JVS

WINGED BEAN

- 563 SRI KANTHA (S), HETTIARACHCHY (NS) and ERDMAN (JW) Jr. Laboratory scale production of winged bean curd. *J. Food Sci.* 48(2); 1983; 441-4, 447

OILSEEDS AND NUTS

- 564 PACE (CN). Protein conformations and their stability. *J. Am. Oil Chem. Soc.* 60(5); 1983; 970-75

A theoretical discussion of the conformational changes that occur, when a native protein, in its normal globular form, unfolds, and gets denatured is presented. The globular conformation, which is absolutely essential for the biological function, is only marginally stable. This low conformational stability is important because many properties of the protein, e.g. solubility and proteolytic digestibility, change substantially when the protein unfolds. Recent developments of interest to protein chemists and food scientists are illustrated and discussed. KMD

- 565 MCGREGOR (DI), MULLIN (WJ) and FENWICK (GR). Analytical methodology for determining glucosinolate composition and content. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 825-49

- 566 GAYDOU (EM), RASOARAHONA (J) and BIANCHINI (J-P). A micro method for the estimation of oil content and fatty acid composition in seeds with special reference to cyclopropenoic acid. *J. Sci. Food Agric.* 34(10); 1983; 1130-36

Sodium methoxide in methanol has been shown to be a satisfactory and convenient transmethylation reagent for use with small samples of a range of seeds containing cyclopropenoic fatty acids. This micro method which has been currently used for cottonseed, kapok, (*Ceiba pentandra*), paka (*Urena lobata*) and baobab (*Adansonia grandidieri* and *A. suarezensis*) is rapid and does not require the use of special apparatus. It can be used routinely for the accurate estimation of oil content and/or fatty acid composition with particular reference to malvalic and sterculic acids. KAR

RAPESEED

- 567 HUBER (J), KRANZ (G), KREIBICH (G), BEINING (K), KRUGER (M) and WEISSBACH (F). Microbiological degradation of glucosinolates in defatted rapeseed meal. *Nahrung.* 27(3); 1983; 257-63 (German)

Two bacterial strains (*Bacillus cereus*) and one yeast strain (*Trichosporon cutaneum*) have been discovered which can decompose glucose-inolates (GSL) and vinyl thio-oxazolidon (VTO) which are present in rapeseed oil-cake. The *B. cereus* strains are all the more active when other, particularly gram-negative, bacteria are also present. Drinking tests on Wistar rats showed a close correlation between the presence of the mainly bitter-tasting, anti-nutritive factors in rapeseed and the absence of weight gain by the animals. KMD

SOYABEAN

- 568 BECZNER (J), KISS (I) and PEREDI (J). Influence of ionizing radiation and storage conditions upon some quality parameters of soyabeans. *Acta Aliment.* 12(1); 1983; 55-70

The microbial contamination of soyabeans can be kept at the initial low value by treatment with 1 kGy irradiation, even under unfavourable storage conditions for a period of 2 months. Irradiation may be applied as a temporary solution to stabilize the microbiological state of soyabeans. AA

- 569 CHUAH (EC), IDRUS (AZ), LIM (CL) and SEOW (CC). Development of an improved soy protein-lipid film. *J. Food Technol.* 18(5); 1983; 619-27

- 570 MOLINA (MR), BRAHAM (JE) and BRESSANI (R). Some characteristics of whole corn: Whole soyabean (70:30) and rice: Whole soyabean (70:30) mixtures processed by simple extrusion cooking. *J. Food Sci.* 48(2); 1983; 434-7

Mixtures of corn or rice with dehulled soyabeans (70:30) were extruded at three cone openings. Processing temperatures were inversely correlated with cone opening. As cone opening increased, fat retention and nitrogen solubility index increased, while dispersibility, protein nutritive value and acceptability (as "atole") by school children decreased. The PER and NPR of the mixtures were significantly ($P < 0.05$) correlated with processing temperature ($r = 0.90$ for both) and sensory score ($r = 0.83$ and 0.82 , respectively). No correlation was observed between protein nutritive value and residual antiphenological factors of the products. After storage of mixtures for 12 weeks at 4 and 25 C, fat acidity values were lower than 2%; those stored at 35 C showed nearly 10%. All samples were equally acceptable. AA

- 571 KADAN (RS), ZIEGLER (GM) Jr. Effects of ingredients on iron distribution in spray-dried experimental soy beverage. *Cereal Chem.* 61(1); 1984; 5-8

Experimental soy beverages fortified with three iron sources and other additives at two levels were spray-dried and analyzed for metallic, complexed, and soluble iron in aqueous and acidic slurries. Analysis of variance showed that iron distribution differed according to the pH of the medium. In aqueous (pH 7) slurries, the metallic iron is affected by the presence of lipids, glucose, fiber, and ascorbic and citric acids, whereas the soluble iron is affected by the presence of FeSO_4 , electrolytic iron, ascorbic and citric acids, and combinations of ingredients. In acidic slurries, the soluble iron is affected only by FeSO_4 , electrolytic iron, and ascorbic acid. Ferrous ions of soluble iron in acidic slurries are increased by the presence of glucose, sucrose, FeSO_4 , ascorbic acid, and the combinations of glucose and ascorbic acid. Some of these ingredients have been reported to increase bioavailability of iron in foods. AA

- 572 ERIKSEN (S). Application of enzymes in soy milk production to improve yield. *J. Food Sci.* 48(2); 1983; 445-7

Soy milk was produced from full fat flour by preparing a slurry in water at a water to flour ratio of 10 to 1. The slurry was heated to 50 C, and different enzymes were evaluated in order to optimize protein and solids yields in the milk. The reaction period was 1 hour and after inactivation of the enzymes by boiling for 15 minutes the mixtures were centrifuged at $1500 \times g$ and the protein and dry matter solubility indices (PSI and DSI) were calculated together with protein and dry matter yields in the obtained milk. The best results were obtained with a neutral proteinase, increasing the protein

and solids yields from 33% and 42% respectively, to 73% and 66%, respectively, at 0.5% dosage level compared to the control sample with no enzyme treatment. AA

- 573 CHEN (JT) and SNYDER (HE). Detection and control of soy milk astringency. *J. Food Sci.* 48(2); 1983; 438-40

Soymilk was made less astringent by the addition of skimmed cow's milk (SCM), CaSO_4 or citric acid. The additions of CaSO_4 and citric acid were not sufficient to cause visible separation of soymilk solids, but there was some difference in mouthfeel due to the addition. Warm temperatures (65 C) of the soymilk resulted in a loss of astringency compared to sensory evaluation at room temperature or 4 C. Analyses for total polyphenols showed statistically significant decreases in apparent polyphenol content per gram of soymilk solids with the first level of addition of SCM, CaSO_4 , or citric acid but not with subsequent additions. AA

- 574 LEE (YC), ROSENAU (JR) and PELEG (M). Rheological characterization of tofu. *J. Texture Stud.* 14(2); 1983; 143-54

The rheological behaviour of four types of tofu was evaluated through compressive stress-strain relationships, relaxation parameters, and percent recoverable work at different strains. It is shown that tofu's deformability mode, like that of sponges, is regulated by both the solid matrix properties and internal hydrostatic pressure. Because the later is strongly affected by the specimen geometry and the deformation rate, the dependency of mechanical parameters on these factors should be considered as an inherent characteristic of tofu's texture. AA

SUNFLOWER SEED

- 575 PIFFERI (PG) and VACCARI (A). The anthocyanins of sunflower. II. A study of the extraction process. *J. Food Technol.* 18(5); 1983; 629-38

The extraction process of red pigments from the husks of a cultivar of sunflower has been studied. It has been shown that a fraction containing circa 80% of the starting pigments could be obtained by grinding. Best extractions were obtained with distilled water-organic solvent mixtures of intermediate polarity values. The extraction yields are strongly influenced by the pH and the solvent/powder ratio and reach the maximum after about 2 hours. The experimental data showed that the greater part of the pigments, readily precipitable by acidification to pH 2.0, are bonded to a macromolecule, probably of protein nature, as confirmed by electrophoresis. AA

- 576 MORRISON (WH). Variation in the wax content of sunflower seed with location and hybrid. *J. Am. Oil Chem. Soc.* 60(5); 1983; 1013-4

Three genetically different types of oilseed sunflower hybrids grown at six different locations were evaluated for the influence of hybrid and location on wax content of hull and oil. Analysis of variance showed that differences in the amount of hull and wax content of the hull were related to both location and hybrid. However, location and hybrid were not found significantly to influence wax content of the oil. AA

ALMOND

- 577 KING (AD) Jr, HALBROOK (WU), FULLER (G) and WHITEHAND (LC). Almond nutmeat moisture and water activity and its influence on fungal flora and seed composition. *J. Food Sci.* 48(2); 1983; 615-7

Higher moisture in almonds, a possible result of rain during harvest, was studied. Water activity (a_w) was positively correlated with moisture, increased reducing sugar and free fatty acid, and negatively correlated with total fat of almond kernels. These parameters indicate increased metabolism in the moist kernel and may be the cause of "concealed damage", a defect evidenced by brown centres in heated almonds. An almond water sorption isotherm has been developed and compared to mathematical equations. Fungal growth occurred at a_w 0.75 and above. Time for visible growth development was related to a_w and moisture. Fungal growth on the kernel depended upon a_w and time. Static flora did not change at a_w 0.70 and below. *Aspergillus glaucus* group was most frequently isolated at a_w 0.75-0.80 and other storage fungi more frequently as the a_w increased to 0.9. *A. niger* was the most frequent isolate. AA

CASHEW NUT

- 578 OGUNMOYELA (OA). Prospects for cashew apple processing and utilization in Nigeria. *Process Biochem.* 18(2); 1983; 6-7

Discusses nutritional significance; and processing applications. BSN

GROUNDNUT

- 579 PEARSON (JL) and SLAY (WO). Effects of packaging method and grade size on storage quality of newly harvested peanuts. *J. Food Sci.* 48(2); 1983; 448-51

Newly harvested and cured cv. Florunner jumbo (> 8.33 mm dia), split (> 6.75 mm dia) and no. 1 (< 7.14, > 6.35 mm dia) peanuts were packed as shell-seed in plastic bags, CO₂ atmosphere; in burlap bags, and as farmers stock, bulk. After 1, 3 and 6 months ambient storage, they were tested for moisture, colour of raw seed-coat and colour and flavour of peanut butter. Packaging showed no effect on flavour, but seed size did. No. 1's showed a linear loss of flavour with time and generally had the highest moisture level and produced the darkest butter. After 6 months, burlap-bag storage yielded the darkest raw seed coats, while plastic bag-CO₂ generally maintained the highest moisture level and produced the darkest butter. AA

- 580 HOW (JSL) and YOUNG (CT). Comparison of fatty acid content of imported peanuts. *J. Am. Oil Chem. Soc.* 60(5); 1983; 945-7

Variability in fatty acid compositions of peanuts imported from six different countries into the United States were studied to determine their effect on processing and storage conditions. The oil content ranged from 44.1 to 50.4%. Major fatty acids, palmitic acid (C16:0), oleic acid (C18:1), and linoleic acid (C18:2) ranged from 8.6 to 12.7, 35.9 to 61.1 and 21.7 to 44.2% respectively. Oleic and linoleic acids together comprised ca. 78.0-83.0% of the total fatty acids. Highly significant differences ($P < .01$) in fatty acid compositions were obtained between samples and between locations (countries of origin). Indicators of stability of the peanut samples as measured by the

oleic/linoleic acid ratio (O/L) and iodine value (IV) of the extracted peanut oils showed variable but significant differences ($P < .05$) between locations. Generally, higher O/L ratios corresponding to lower IV indicate better stability and longer shelf-life of the samples. AA

- 581 ORY (RL) and CONKERTON (EJ). Supplementation of bakery items with high protein peanut flour. *J. Am. Oil Chem. Soc.* 60(5); 1983; 986-9

A peanut flour, with 55-60% protein, was used to replace 12.5% of the wheat flour in bread, 100% of wheat flour in muffins, and 10, 15, or 50% of wheat flour in cookies. Peanut flour (at 12.5% level), increased total solids, protein, moisture retention after baking, and dietary fibre in bread, without affecting loaf volume. The crust colour of the supplemented bakery items was darker brown, the texture coarser in bread and harder in cookies, but the items were still acceptable. Peanut flour muffins with a net protein content of 33-40% can serve as a high protein snack food, or bakery item, possibly for patients with coeliac disease who cannot tolerate wheat flour. Other chemical and physical properties of these products support the use of peanut flour as a supplement in selected food products. KMD

TUBERS AND VEGETABLES

- 582 ZYREN (J), ELKINS (ER), DUDEK (JA) and HAGEN (RE). Fiber contents of selected raw and processed vegetables, fruits and fruit juices as served. *J. Food Sci.* 48(2); 1983; 600-603

Pectin and neutral detergent fiber (NDF) contents were investigated for commercially processed foods as served: 10 vegetables, 10 fruits, and 8 fruit juices. Fiber content of fruits ranged from 0.7%-4.5% NDF and 0.28%-0.48% pectin; juices ranged from 0.1%-0.22% NDF and 0.2%-0.39% pectin. Fiber in frozen, canned and cooked vegetables ranged from 1%-4.4% NDF and 0.5%-1% pectin. In general, there is no evidence that any of the food preparation methods was superior. There appears to be no great loss of fiber when food is prepared by typical home methods or commercial processing. AA

NIRA

- 583 IIDA (H), HASHIMOTO (S), MIYAZAWA (M) and KAMEOKA (H). Volatile flavour components of nira (*Allium tuberosum* Rottl.). *J. Food Sci.* 48(2); 1983; 660-61

POTATO

- 584 MONDY (NI) and PONNAMPALAM (R). Determination of total glycoalkaloids (TGA) in dehydrated potatoes. *J. Food Sci.* 48(2); 1983; 612-4

A method was developed to optimize TGA extraction for dehydrated potato products. Maximum TGA content was obtained from uncooked dehydrated powder with hydration ratio (powder:water) of 1:4 (by weight) for the freshly prepared powder. Powders prepared from precooked potatoes required a hydration ratio (1:5) for optimum TGA extraction. For powders that were stored for 4 months, 1 hour of hydration was necessary for maximum TGA extraction. In all varieties tested, the TGA content of powders was slightly less than the fresh

tissue but these differences were not statistically significant. However, significant varietal differences were observed. The Chipbelle and Katahdin varieties were significantly higher in TGA content than Rosa and Pontiac varieties. AA

- 585 MATTHEW (JA), MORGAN (MRA), McNERNEY (R), CHAN (HWS) and COXON (DT). Determination of solanidine in human plasma by radioimmunoassay. *Food Chem. Toxicol.* 21(5); 1983; 637-40

A radioimmunoassay for solanidine, the major hydrolysis product of potato glycoalkaloids, has been established and validated for application to human plasma. All 34 samples of human plasma tested contained solanidine, with a mean of 1.27 ± 0.97 ng/ml (3.18 ± 2.43 nmol/litre). AA

SWEET POTATO

- 586 CREAMER (G), YOUNG (CT) and HAMANN (DD). Changes in amino acid content of acidified sweet potato puree. *J. Food Sci.* 48(2); 1983; 382-8

The stability of nitrogenous substances in processed sweet potato puree was examined. Protein and nonprotein nitrogen (NPN) fractions were extracted from sweet potato puree adjusted to pH 4.2, treated with amylolytic enzymes and processed at 88 C to determine changes in amino acid concentrations over a 6-month period. Amino acid concentrations in the protein fraction were generally found to remain stable over the storage period. NPN amino acid concentration either remained stable or increased slightly with storage time. The results of this work indicate that there would be no appreciable loss of nitrogenous substances in sweet potato puree subjected to the conditions of the experiment. AA

COLOCASIA

- 587 WILLS (RBH), LIM (JSK), GREENFIELD (H) and BAYLISS-SMITH (T). Nutrient composition of taro (*Colocasia esculenta*) cultivars from Papua New Guinea high lands. *J. Sci. Food Agric.* 34(10); 1983; 1137-42

YAM

- 588 IKEDIABI (CO) and OTI (E). Some biochemical changes associated with post-harvest storage of white yam (*Dioscorea rotundata*) tubers. *J. Sci. Food Agric.* 34(10); 1983; 1123-9

VEGETABLES

- 589 KARKI (T), ITOH (H), KIUCHI (K), EBINE (H) and KOZAKI (M). Lipids in "Gundruk" and "Takana" fermented vegetables. *Food Sci. + Technol.* 16(3); 1983; 167-71

The lipids and fatty acid composition of Nepalese mustard vegetable (*Brassica juncea*), of "Gundruk" prepared from the mustard vegetable and cau-

liflower, and of "Tataka" a Japanese salted and fermented vegetable (*Brassica juncea*) were investigated. "Gundruk" is the name of the non-salted and fermented product from Nepal. The lipid fractions consisted mainly of hydrocarbons, triglycerides, free fatty acids, monoglycerides, and polar lipids. The polar lipids constituted the bulk of the lipids in the fermented vegetables. When mustard vegetable was fermented to prepare "Gundruk", hydrocarbons, triglycerides, and two unknown fractions decreased, whereas diglycerides, sterols, monoglycerides, and polar lipids increased. Remarkably enough, the mustard vegetable underwent hydrolysis and produced free fatty acids during "Gundruk" fermentation. The changes in fatty acids - perhaps due to fermentation - were mainly in the contents of palmitic, oleic, linoleic, linolenic, and lauric acids. KMD

- 590 KARKI (T), ITOH (H), HAYASHI (K) and KOZAKI (M). Chemical changes occurring during "Gundruk" fermentation. Part II - 1. Amino acids. *Food Sci. + Technol.* 16(3); 1983; 180-83

"Gundruk" is the name of a fermented vegetable product, made in Nepal, usually from vegetable mustard (*Brassica juncea*) or cauliflower (*Brassica oleracea*). "Tsukemono" is the name given to Japanese vegetable pickles of the same type, including various products like "Takana" (*Brassica juncea*), "Yozawana" (*Brassica napa*), "Hiroshimana" (*B. pekinensis*), and "Sunki" (*B. napa* var. *sunkina*). Of these pickles, only the Nepalese "Gundruk" and the Japanese "Sunki" are non-salted and fermented pickles. In "Gundruk" made from vegetable mustard, fermentation increases remarkably the content of some amino acids (e.g. glutamic acid, alanine, leucine, lysine, and threonine) and decreases that of some others (e.g. asparagine, glutamine, histidine, and arginine). KMD

LEAFY VEGETABLE

- 591 FABOYA (OOP). Mineral content of some green leafy vegetables commonly found in the Western part of Nigeria. *Food Chem.* 12(3); 1983; 213-6
12 leafy vegetables were analysed and the results are given. KAR

CABBAGE

- 592 HOLT (JE). Cracking and energy dissipation in cabbages. *J. Texture Stud.* 14(2); 1983; 99-111

Whole cabbages were subjected to impact and quasi-static compression, and it was observed that the main type of damage was cracking through the leaf layers. In static loading, the cabbages withstood very high compression loads before major cracking began, with forces between 4000-4500 N. On impact, cracking of cabbages occurred at drop heights of 0.25 m and greater. There is a very strong linear relationship between total leaf crack length and energy dissipated during the drop. The crack resistance of cabbage is described by both the slope of the crack length energy dissipative response and the intercept of the line on the energy axis. Three energy dissipative mechanisms operate during the compression loading of cabbages; energy is stored elastically to be recovered in rebound; energy is stored to be dissipated by crack propagation, and energy is dissipated by leaf movement. The energy dissipative mechanisms can be explained in terms of the structure of the whole cabbage and leaf tissue. Crack resistance is a useful property of cabbages. It may be used to evaluate cabbage varieties for texture and cabbage handling systems for damage. AA

- 593 RODRIGUEZ (R), SAHA (NK) and AGARWAL (PC). Physico-chemical characteristics of some cabbage cultivars and their suitability for canning. *Indian Food Packer*. 37(4); 1983; 52-9

10 cultivars of cabbage grown locally were studied for their physico-chemical characteristics and suitability for canning. Data on yield, season of availability, dimensions and compactness of the head of the cultivars studied have been presented. The cultivars did not differ much in their chemical composition. On canning, in the form of section, all of them exhibited pink discolouration of varying intensities during storage. Discolouration was considerably reduced when canned in the form of shreds. Blanching in water containing 350 ppm. SO_2 and reblanching in water to remove excess SO_2 eliminated discolouration in the cultivars. Pride of India and Infusion of Glory canned both as sections and shreds, and in the cultivars Lucknow Local, Drum head and Golden Acre only when canned as shreds were found satisfactory. The product texture was more acceptable in the cultivar Drum head, Lucknow local, Golden Acre and Savoy. An overall assessment for colour, texture and taste of the product showed that cultivar Lucknow local, and Drum head were most satisfactory for canning, as shreds and as canned cabbage sections, the best performance was recorded by the cultivar Infusion of Glory. The cultivar of India and Golden Acre were satisfactory both as shreds and sections. AA

- 594 MILLER (KW), BOYD (JN), BABISH (JG), LISK (DJ) and STOEWESAND (BS). Alteration of glucosinolate content, pattern, and mutagenicity of cabbage (*Brassica oleracea*) grown on municipal sewage sludge-amended soil. *J. Food Safety*. 5(3); 1983; 131-43

Cabbage (*Brassica oleracea* variety capitata) was grown on soil (control) or municipal sewage sludge-treated plots. The cabbage was freeze-dried and analyzed for glucosinolate content and pattern. Results showed that cabbage grown on sludge-amended soil contained only half the glucosinolate content of cabbage grown on the control plot. The pattern of individual glucosinolates present was also altered. The sludge-grown cabbage glucosinolate extract was shown to be mutagenic in the nonactivated test system of *S. typhimurium* TA 100. Extracts of both sludge-grown and control cabbage were shown to enhance the mutagenicity on a dose-response basis of aflatoxin B_1 , benzo(a)pyrene, and captan. AA

- 595 STEVENS (BJH) and SELVENDRAN (RR). Pectic polysaccharides of cabbage (*Brassica oleracea*). *Phytochemistry*. 23(1); 1984; 107-15

- 596 PETZINGER (G), BARRY (TL) and STENSON (M). GC-MS identification of prothiophos in imported preserved cabbage. *Bull. Environ. Contam. Toxicol.* 31(1); 1983; 116-9

TOMATO

- 597 SILVESTRI (G), SIVIERO (P), PELIZZIARI (A) and ZONI (C). Behaviour of recent varieties and hybrids of processing tomatoes - results obtained in 1982. *Ind. Conserve*. 58(1); 1983; 10-18 (Italian)

The characteristics and the agronomical behaviour were evaluated of 34 tomato hybrids and varieties recently offered by the seed industry for the production of concentrates and/or canned peeled tomatoes. Only few of the strains tested proved worth cultivating on a commercial scale for their yield, and quality characteristics. AA

- 598 STEIN (ER). Electrophoretic analysis of selected enzymes from tomato cultivars with different fruit maturation. *J. Agric. Food Chem.* 31(6); 1983; 1366-8

CAPSICUM

- 599 LUKASIK (S), ACHREMOWICZ (B), KULPA (D) and FRACZEK (T). Effect of chlorflurenol on the yield and technological value of red pepper (*Capsicum annuum*, L.). *Acta Aliment.* 12(2); 1983; 101-7

Treatment on the whole *Capsicum* plant in full bloom, or of its individual flowers, with chlorflurenol increased the total number and total weight of the fruits, though the individual fruits were smaller than those of untreated, control plants. Other results obtained with chlorflurenol treated plants were: (i) seedless fruits were developed on such plants; (ii) the maturity time was shortened by 3-5 days; (iii) the contents of vitamin C, protein, dry matter, total extract, and total sugar increased; and (iv) the content of β -carotene decreased. KMD

PLANTAIN

- 600 MARRIOTT (J), ROBINSON (M) and KARIKARI (SK). Compositional changes during ripening of plantain fruits of three cultivars. *Fruits.* 38(4); 1983; 343-7 (French)

Plantains from 3 cultivars (two of the "Horn" type, and one of the "French" type) were used to study the conversion of starch into sucrose, glucose, and fructose, during ripening at 20 C. A similar evolution occurred in all the three types of plantains, but it was very different from that observed in the "Cavendish" bananas. The degradation of starch was shown in these plantains and was never total, even at the over-ripe stage. Sucrose accounted for 70% of the total sugars when the plantains were completely yellow, but only for 50% when they were over-ripe. Because of the slow and continuous nature of these changes, the composition of ripe plantains - yellow but not yet brown, - varied from 3 to 12% of starch, and 18 to 28% total sugars. KMD

CUCUMBER

- 601 COREY (KA), PHARR (DM) and FLEMING (HP). Role of gas diffusion in bloater formation of brined cucumbers. *J. Food Sci.* 48(2); 1983; 389-93, 399

A method was developed to measure diffusion rates of CO_2 and N_2 through fresh and brined cucumber tissue to examine the role of gas diffusion in bloater formation. The diffusion rate of CO_2 was 3.2 times greater than N_2 through fresh and 2.4 times greater than N_2 through brined cucumber tissue. The ratio of the diffusion rates of CO_2 to N_2 through brined cucumbers was not significantly altered from that of fresh fruit. Solubility of gases was determined to be a factor governing the rate and extent of bloater damage. Maximum rates of increase in expansion volume of N_2 -exchanged cucumbers was 0.42, 1.30, and 11.90% hr^{-1} for brines purged with Ar, CO_2 , and SO_2 , respectively, and 0.89% hr^{-1} for Ar-exchanged fruit following purge of the brine with CO_2 . AA

- 602 GUHA (AK), ROY (R), DAS (HN) and ROY (BR). Bacteriological quality of cucumber slices and its public health significance. *J. Food Sci. Technol. (India)* 20(5); 1983; 245-7

68 samples of cucumber (*Cucumis sativus*) collected from the roadside vendors in Calcutta (India) in summer (March-October) and winter (November-February) were analyzed. Average standard plate count, psychrophilic and lipolytic bacteria, yeast, mould, enterococci, coliform, and faecal coliform were 43.8×10^3 , 5.4×10^3 , 2.3×10^3 , 1.8×10^3 , 0.8×10^3 , 1.3×10^3 , 2.9 and 0.5 respectively per g of sample. Coliform, faecal coliform and enterococci were detected in 94.2, 77.6, and 89.7% of the samples respectively. In 19 samples, presence of *Escherichia coli* was confirmed. Most of the strains were resistant to penicillin, followed by erythromycin and ampicillin, but sensitive to Chloramphenicol and Streptomycin. Tetracyclines were less effective than Chloramphenicol and Streptomycin. Only 2 strains of *E. coli* out of 30, were sensitive to antibiotics. A small number of coagulase positive *Staphylococcus aureus* was detected in a few samples. *Salmonella*, *Shigella*, *Vibrio*, *Cholerae* and *V. Parahaemolyticus* were not detected in curry samples. KAR

MELON

- 603 OBIORA ONUORA (J) and KING (RD). Melon seed flour: Composition and factors affecting the extractability of nitrogenous constituents. *Food Sci. + Technol.* 16(3); 1983; 162-6

The yield of flour from Nigerian melon seeds was 32% by weight of the sundried seeds, and 41% by weight of the kernels. Its proximate composition was 72% crude protein, 1-5% crude fat, 11% total available carbohydrates, 9% ash, and 4.5% acid detergent fibre. Studies of the solubility of melon seed protein indicate that it has 67% of globulins. The protein showed minimum solubility at pH 4.0. In salt solution, it showed a different pH-nitrogen solubility profile, with low solubility at pH values <5, and a sharp rise in solubility at pH 7.0. Detergents completely solubilized melon seed flour proteins. KMD

BITTERGOURD

- 604 KALRA (CL), PRUTHI (JS), TEOTIA (MS), RAINA (BL), SHARMA (BR) and NANDPURI (KS). Influence of variety on the quality of processed bittergourd (Karela). *Indian Food Packer.* 37(4); 1983; 71-7

5 cultivars of bittergourd (Karela) namely BG-12, BG-13, BG-14, C-96 and Sel-1, developed by Punjab Agricultural University, Ludhiana, were analysed for their physico-chemical characteristics and assessed for their suitability for processing. All the varieties were found to be a good sources of ascorbic acid and a moderate source of protein. The sugar content was found to be low in all the cultivars. Ascorbic acid appeared to decrease with the size of the fruit. Losses in ascorbic acid during processing has also been tabulated. The cultivar BG-14 was found to be the best for canning, followed by C-96 mainly due to their superior colour, texture and flavour. For the purpose of dehydration, the cultivar BG-14 is recommended, followed, by cultivar BG-13, because they reconstituted to their original shape reasonably well and had good acceptance in curry preparation. BSN

FRUITS

- 605 HARTMANN (C). The post-harvest fruit: Enzymes, maturation, and senescence. *Fruits*. 38(6); 1983; 499-504 (French)

The post-harvest fruit finds itself in a state of senescence - or the last phase of its life-- when it has lost its faculty of cellular division. The author tries to make us understand the characteristic transformations during senescence, and the role of enzymes in these transformations. Several theories have been discussed, especially the theory of "programmed death" which is inscribed in the genetic heritage. These theories are not necessarily mutually exclusive. KMD

- 606 ANON. Semi-processed fruit and berries as raw materials for food processing. *Indian Food Packer*. 37(4); 1983; 23-33

A resume of a study undertaken by ITC market research on consumer packed products covers: objectives of the study, definition and product description including those fruit and berries preserved by freezing by canning and in solution; import regulations and customs duties of the EEC (European Economic Communities) under which are included quantitative restrictions, customs duties, quotas and preferences, "added sugar" levy, ACP (African, Caribbean and Pacific) associated with EEC; and EEC common external tariff (CET) on selected and semi processed fruit and berries, imported into EEC. BSN

- 607 LOZANO (Y). Quality, packaging, and health, or the impact of technology on the food quality of fresh and processed fruits offered to the consumer. *Fruits*. 38(6); 1983; 487-98 (French)

The first part of this article describes the principal problems that arise in the maintenance and control of the food quality of various provisions, so as to avoid their contamination by the materials with which they come in contact. The aspects covered are: (a) chemical-heavy metals, organic and synthetic compounds; (b) toxicological; (c) organoleptic; (d) microbiological; and (e) regulation and control. The second part of the article, describes the characteristics of the (packaging) materials with which fruits come into contact. Special attention is devoted to fruit juices, and fruit-based beverages, wherein the whole chemical and enzymatic arsenal of the fruit is very favourably placed to trigger decomposition reactions, both in the juice itself and in the packaging material. The consumer can detect certain types of degradation by himself, but there are certain others - e.g. latent microbiological contamination, or toxic pollution - which he cannot detect, and which may have escaped detection during the preceding quality control procedures. Such contaminations may produce in the long term, irreversible imbalances in the metabolic pathways which are in a metastable state in the human organisms. KMD

- 608 VAMOS-VIGYAZO (L), and NADUDVARI-MARKUS (V). Inactivation of polyphenol oxidase and depletion of o-dihydroxy phenol content during the enzymatic browning reaction of fruit tissues. *Acta Aliment*. 12(1); 1983; 1-9

In order to study enzyme inactivation and substrate depletion during the browning reaction of fruit tissues, the changes in these variables were followed in aerated pulps of two apricot and two apple cultivars of different mass-related polyphenol oxidase activities and o-dihydroxy phenol contents. Although enzyme activity decreased from the beginning of aeration, in the majority of samples substrate concentration reached levels near to depletion

while polyphenol oxidase activity was still considerable. The results obtained with apricots suggested that not all the o-dihydroxy phenols present in this fruit were substrates of polyphenol oxidase. Enzyme inactivation related to unit decrease in o-dihydroxy phenol content was more marked in the samples of higher initial polyphenol oxidase activities and lower o-dihydroxy phenol contents and vice versa. This means that the reaction inactivation of polyphenol oxidase was inversely related to product formation. Consequently, under the given conditions, enzyme inactivation during the polyphenol oxidase-catalyzed oxidation of o-dihydroxy phenols cannot be caused by quinone binding by the enzyme molecule. AA

- 609 BILGRAMI (KS), SINHA (KK) and ANJANA SINGH. Chemical changes in dry fruits during aflatoxin elaboration by *Aspergillus flavus* Link. Ex Fries. *Curr. Sci.* 52(20); 1983; 960-64

Chemical changes occurring in dry fruits during aflatoxin production in dry fruits by *A. flavus* were investigated in several dry fruits - coconut, almond, cashewnut, walnut and makhana (*Euryale ferox* Salisb.). Maximum amount of aflatoxin B₁ (23.4 ppm) was elaborated on account as compared to other dry fruits. Important chemical changes included significant loss in the quantity of total, reducing and non-reducing sugars as well as in ascorbic acid level. Increases in protein and phenol levels were also observed. MVG

- 610 LAWRENCE (JR) and IYENGAR (JR). Determination of paraffin wax and mineral oil on fresh fruits and vegetables by high temperature gas chromatography. *J. Food Safety.* 5(3); 1983; 119-29

Paraffin wax and mineral oil coatings were determined on a large number of domestic and imported fruits and vegetables by high-temperature gas chromatography employing a Dexil 300 liquid phase with temperature programming up to 400 C. The surface coatings were removed from the foods by repeated dipping in chloroform. The chloroform extracts were concentrated and analyzed directly by gas chromatography. Identification of the waxes was made by comparison to known paraffin or mineral oil standards. Paraffin wax or mineral oil were found on squash, turnip, cucumber, sweet potatoes, egg plant, and most citrus fruits. AA

- 611 NAVARRO (G), NAVARRO (S), MUNOZ (JJ) and LOPEZ (JM). Application of the ionic exchange chromatography to the study of commercial pectins. *Rev. Agroquim. Tecnol. Aliment.* 23(1); 1983; 143-7 (Spanish)

The chromatographic separation into fractions of two different types of commercial pectins, with high and low methoxyl content, was carried out on DEAE-Sephacrose CL 6B. The results obtained show the heterogeneity of the pectins studied in function of their degree of esterification, which is considered as the medium value of the corresponding separated subfractions. The method used allow the separation of natural sugars linked to the principal polygalacturonic chain, by elution with the less molarity buffer (0.05 M). AA

- 612 GARCI (C) and MARINE (A). Serotonin content in fresh and processed foods. *Rev. Agroquim. Tecnol. Aliment.* 23(1); 1983; 60-70 (Spanish)

Spectrofluorimetric and thin layer chromatographic studies are made of serotonin levels in several foods. For the first time, the presence of serotonin is shown in apricots, cherries and peaches; levels in apricots ranged between 0.3 and 0.8 µg/g, in cherries between 0.3 and 0.6 µg/g, in plums between 0.5 and 8.9 µg/g, in peaches between 0.4 and 1.6 µg/g and in canned

fried tomato between 1.5 and 2.4 µg/g. In black and green olives, almonds, canned tuna fish, beer, "Chorizo" (Spanish sausage), flour, bread, gherkins, fresh fish, cheese, soya and vinegar, the presence of serotonin was not detected. Based on the limit of the analytical method used; these results indicate levels lower than 0.07 µg/g. In all cases studied, the levels of serotonin not seem to be of importance from a toxicological point of view.
AA

STRAWBERRY

- 613 CURZIO (OA), QUARANTA (HO), PICCINI (JL) and PEREZ (SS). Adaption of a steam distillation method for determining total volatile acids in strawberries. *Dtsch. Lebensmittel Rundschau*. 79(2); 1983; 46-7

The authors have presented an analysis of volatile acids in strawberries (Variety Tioga) at various degrees of decomposition, and have compared the values for pure volatile acid solutions, with those for strawberry pulp spiked with short-chain volatile acids. KMD

- 614 HIRVI (T). Mass fragmentographic and sensory analysis in the evaluation of the aroma of some strawberry varieties. *Food Sci. + Technol.* 16(3); 1983; 157-61

The aromas of 8 Finnish varieties of fresh and deep-frozen strawberries (*Fragaria xananassa*) were studied by mass fragmentometry and sensory evaluation. 17 major components were determined in each of the varieties. Intensity of colour, character of odour, overall impression of odour, sweetness, overall impression of taste, sourness, off-odours, and off-tastes were evaluated by a graphical scale method. Soluble solids and titratable acids of the deep-frozen berries were also determined for comparison of the sweetness and sourness of the different varieties. The concentrations of the most important aroma compounds, viz. ethyl hexanoate, ethyl butanoate, trans-2-hexenal, 2,5-dimethyl-4-methoxy-3(2H)furanone, and linalool were the highest among the varieties Senga sengana, kristina, and Lihama X Senga Sengana. These three varieties had the best odour. Close correlations were also obtained between titratable acidity and sourness. KMD

BANANA

- 615 CABLE (WJ). The cooking bananas of Samoa. *Fruits*. 38(4); 1983; 351-4 (French)

CITRUS

- 616 PARK (GL), AVERY (SM), BYERS (JL) and NELSON (DB). Identification of bioflavonoids from citrus. *Food Technol.* 37(12); 1983; 98-105

The purpose of this study was to apply HPLC for the isolation, identification and quantitation of flavonoids in commercially prepared biflavonoid extracts of orange and lemon peel. HPLC was found to be suitable for the analysis of bioflavonoid preparations. By using this technique, the major components (flavonone and flavone) of lemon bioflavonoid complex and hesperidin complex have been determined; two di-C-glycosylflavones not reported so far have been identified. JVS

- 617 GRAUMLICH (TR). Potential fermentation products from citrus processing wastes. *Food Technol.* 37(12); 1983; 94-7

Sources of fermentation substrates, products of fermentation (ethanol, wine, methane, protein,) and limitations in using citrus by-products as fermentation substrates have been reviewed. JVS

- 618 BERRY (RE), SHAW (PE), TATUM (JH) and WILSON (CW). Citrus oil flavour and composition studies. *Food Technol.* 37(12); 1983; 88-91

Review of work carried out at Citrus and Sub Tropical Products Laboratory, USDA, on: components influencing mandarin and grape fruit oil quality/flavour; relationship of volatile sulphides to fresh juice flavour, and the role of instrumentation in flavour analysis. The more important tables provide data on the levels of important flavour compounds, components of grape fruit oil, their products and of grape fruit oil, hydrogen sulphide content in headspace of orange, grapefruit, Tangerine, Tangor, Tangels, lemon and lime fruit juices (fresh and processed). JVS

ORANGE

- 619 WELTI (JS) and LAFUENTE (B). Spray-drying of comminuted orange products. I. Influence of air temperature and feed rate on product quality. *Rev. Agro-quim. Tecnol. Aliment.* 23(1); 1983; 97-106 (Spanish)

- 620 WILLIAMS (NS) and HARRIS (ND). Antioxidant activity in dried orange. *J. Food Sci.* 48(2); 1983; 644-5

The antioxidant properties of ground, dried orange when incorporated into ground beef were studied. The 2-thiobarbituric acid test indicated that at the 3% and 7% levels, by weight, dried orange reduced rancidity development in both frozen and unfrozen cooked meats but not in raw meats. In a second test, photometric measurements showed carotene bleaching and thus oxidation to be reduced by a methanol extract of the dried orange. Compounds responsible for antioxidant activity were not identified. AA

MANGO

- 621 AVENA (RJ) and LUH (BS). Sweetened mango purees preserved by canning and freezing. *J. Food Sci.* 48(2); 1983; 406-10

Mango fruit (*Mangifera indica* L., Kent variety) at canning ripeness was processed as sweetened puree of 42-43 Brix soluble solids by canning and freezing. Sucrose and high fructose corn syrups in various combinations were used as sweeteners. Processed purees, diluted with three parts of water, produced mango nectars of 13% soluble solids for evaluation of chemical and sensory quality. The frozen mango purees contained slightly more ascorbic acid than the canned products. Sucrose and high fructose corn syrups may be used interchangeably as sweeteners. Panel members were not able to distinguish differences in preference for nectars even though some difference in sugar components among them were detected by high performance liquid chromatography. AA

PEACH

- 622 NICKEL (SL) and MARUYAMA (T). Sugar content of commercially processed peach pit kernels and shells. *Dtsch. Lebensmittel-Rundschau*. 79(1); 1983; 19-20

PLUM

- 623 BOOTHBY (D). Pectic substances in developing and ripening plum fruits. *J. Sci. Food Agric.* 34(10); 1983; 1117-22

The fresh weight of plum fruits increased throughout the growing season whilst the weight of ethanol insoluble material increased to a peak in the penultimate sample and then declined. Pectin content paralleled the change in weight of the insoluble residue. There were no significant changes in the proportional composition of monosaccharides in pectin or the total solids. Pectic substances were examined by gel permeation chromatography and high voltage electrophoresis. There was no evidence for extensive degradation of the pectic substances, but changes in the electrophoretic mobility were consistent with de-esterification during ripening. AA

APPLE

- 624 LIDSTER (PD), LIGHTFOOT (HJ) and McRAE (KB). Production and regeneration of principal volatiles in apples stored in modified atmospheres and air. *J. Food Sci.* 48(2); 1983; 400-402,410

In a series of exploratory experiments, storage of McIntosh apples (*Malus domestica* Borkh.) in modified atmospheres (MA) (5% CO₂ + 3% O₂ at 2.8 C) suppressed the development of headspace ethanol and acetaldehyde from that in apples stored in air at 0 C (RA). Acetaldehyde, ethanol, ethyl butyrate and hexanal production from intact fruit was further suppressed when the apples were stored in 1.5% CO₂ + 1.5% O₂ or 1.5% CO₂ + 1.0% O₂ at 2.8 C. Placement of fruit in RA following MA storage initially regenerated ethyl butyrate and hexanal in preference to ethanol and acetaldehyde. However storage of fruit in 1.5% CO₂ + 1.0% O₂ for 320 days completely suppressed the principal headspace volatiles and blocked their subsequent regeneration in RA. AA

- 625 DRAKE (SR) and SPAYD (SE). Influence of calcium treatment on "Golden Delicious" apple quality. *J. Food Sci.* 48(2); 1983; 403-5

The use of a CaCl₂ treatment in the storage of apples improved the keeping quality of fresh apples in prolonged cold storage and did not deter from the quality of the processed product. The fresh market apples in controlled atmosphere storage were firmer with more ascorbic acid than CaCl₂ treated apples in standard cold storage. However, fresh market CaCl₂ treated apples had less green colour, were firmer, with a high titratable acidity and ascorbic acid content, than untreated apples in standard cold storage. The processed products made from CaCl₂ treated apples had better colour and firmness than those made with apples from standard cold storage and better consistency and less weep than those made with apples from controlled atmosphere storage. AA

- 626 MAINI (SB), RAJESH KUMAR, LAL (BB) and ANAND (JC). Prolonging the storage life of apples by treatment with calcium chloride. *Indian J. Agric. Sci.* 53(11); 1983; 974-6

Fruits of 'Red Delicious' apple treated with 4% CaCl_2 (solution temperature of 0 C and fruit temperature of 19 C) for 15 minutes and dried in shade kept well for significantly longer periods (upto 25 days). The treated fruit had firmer flesh, less physiological loss of weight and better retention of quality. MVG

- 627 SCHOORL (D). A practical method for tensile testing of apple tissue. *J. Texture Stud.* 14(2); 1983; 155-64

Granny Smith apple specimens were subjected to tensile loading at three deformation rates, 20, 50 and 100 mm x min⁻¹. Specimens were loaded either to failure or subjected to a load cycle less than required to cause fracture. The mode of failure observed was a sudden crack across the entire specimen perpendicular to the applied force. Unbroken specimens demonstrated considerable hysteresis losses during loading and unloading. Apparent and real fracture resistance values were calculated from the energy dissipated during cracking and crack surface area. Apparent fracture resistance varied from 258-300 Jm⁻², depending on deformation rate, and real fracture resistance was approximately constant at 200 Jm⁻². The hysteresis ratio varied from 0.13-0.4, depending on deformation rate, and this change in hysteresis losses explained the decrease in failure stress and failure deformation as deformation rate increased. It is postulated that fracture resistance, or the resistance to cracking is a useful tensile property of apple tissue. AA

- 628 WILLIAMS (AA), ARNOLD (GM) and WARRINGTON (M). Consumer reaction to processed Suntan apples. *J. Food Technol.* 18(5); 1983; 565-72

A pilot consumer survey showed apple rings prepared from Suntan apples to be liked, particularly with respect to appearance and taste. People, on the whole, preferred a whiter product; texture was acceptable, although respondents would have preferred it to be firmer. Age appeared to be the major demographic factor influencing response, the colour of the product being more favourable to the 45 and over age group, with the 16-24 age group preferring a less sweet product. AA

- 629 KRAUSE (RT) and AUGUST (ME). Applicability of a multiresidue method and high performance liquid chromatography for determining quinomethionate in apples and oranges. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 1018-22

The AOAC multiresidue method for nonpolar pesticide residues in nonfatty foods has been coupled with a high performance liquid chromatographic (HPLC)-fluorometric system for determining quinomethionate residues on apples and oranges. Quinomethionate is extracted with acetonitrile, and coextractives are removed with liquid-liquid partitioning and Florisil adsorbent using the AOAC multipesticide residue method for nonfatty foods. The quinomethionate fraction is then chromatographed on an HPLC octyl-bonded column and detected in-line with a fluorescence detector using 362 nm excitation and 395 nm emission. Recovery studies were conducted with apples fortified with quinomethionate at 0.05 ppm and oranges at 0.05 and 0.5 ppm. The recoveries averaged 100% (range 92-108) at the 0.05 ppm fortification level and 102% (range 93-110) at the 0.5 ppm level. AA

PAPAYA

- 630 GHAYAL (CD) and JOSHI (RN). A kinetic study of papain immobilised in paraffin wax. *Biotechnol. Bioeng.* 35(8); 1983; 2099-101

A simple method of immobilization (500 mg powdered papain, added to

1 g paraffin wax in beaker of 18 cm² cross sectional area at 60 C, cooled and washed with distilled water to remove last traces of remaining enzyme in the beaker) has been reported. Data on kinetic study have been presented and discussed. BSN

BER

- 631 DHINGRA (MK). A note on tannin content of ber (*Zizyphus mauritiana* Lamk). *Indian Food Packer*. 37(4); 1983; 78-9

Tannin content of 9 cultivars of Ber (*Zizyphus mauritiana* Lamk) was determined at green mature and full ripe stages. The tannin content in peel at green mature and full ripe stage ranged from 1.542 to 3.250 and 1.25 to 3.0% respectively, where the corresponding values in pulp were 0.063 to 0.792 and 0.094 to 0.802% respectively. Among the CV Reshmi, Gola and Katho-phal contained more and Umran and Kaithli contained less of tannins. BSN

LITCHI

- 632 SYAMAL (MM), MISHRA (KA), SINGH (KP) and SINGH (BK). Physico-chemical composition of litchi varieties of Bihar. *Indian Food Packer*. 37(4); 1983; 80-82

Five litchi varieties from Bihar (Shahi, Rose Scented, Bedana, Purbi, China) were assessed for their physico-chemical composition including fruit weight, volume, length, seed weight, skin weight, soluble solids content and acidity. On the basis of physico-chemical composition, Shahi was found to be the best variety. Fruit weight was maximum in Shahi and Rose Scented varieties. BSN

KIWIFRUIT

- 633 MATSUMOTO (S), OBARA (T) and LUH (BS). Changes in chemical constituents of kiwifruit during post-harvest ripening. *J. Food Sci.* 48(2); 1983; 607-11

Kiwifruit (*Actinidia chinensis* Planch, Hayward cultivar) were ripened at 20 C under a stream of water-vapour saturated air containing 5 ppm ethylene gas. A remarkable rapid softening in the texture and rising of the soluble solids were observed in 24 hour. The total acidity, starch and amylose content decreased during ripening. Both fructose and glucose increased from 2.7% to 5.0% after 5 days of ripening. Sucrose content increased from 0.45% to 2.22% on the second day, then decreased to 1.19% after 5 days. No significant change in chlorophyll and total solids were observed throughout the experiment. There were stepwise decreases in the L and b_L values during ripening. The ascorbic acid content decreased from 210 to 190 mg per 100 g fresh fruit after 5 days of ripening. AA

- 634 HOLLAND (PT) and MCGHIE (TK). Multiresidue method for determination of pesticides in kiwifruit, apples, and berry fruits. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 1003-8

A rapid multiresidue procedure for fruits, based on methanol extraction, is presented. Water and highly water-soluble co-extractives are removed by partitioning the pesticides into toluene. Carbon-cellulose-Florisil cleanup is performed before gas chromatography on OV-225 with electron capture detection. A wide range of pesticides can be determined to 0.1 mg/kg without

concentrating the extract. Gas chromatography of the crude toluene partition using SE-30 and an alkali flame ionization detector provides confirmatory data and allows detection of some carbamates. Dichlorvos, dimethoate, and acephate are determined directly in the methanol extract by flame photometric detection. High recoveries were obtained for 4 organochlorine insecticides, 13 organophosphorus insecticides, 2 synthetic pyrethroids, two N-methyl carbamates, and 10 fungicides. The method is economical of solvents, glassware, and time, and is recommended for routine surveillance of residue levels on fruit. AA

SUGAR, STARCH AND CONFECTIONERY

- 635 SUORTTI (T). Identification of antimicrobial compounds in heated neutral glucose and fructose solutions. *Z. Lebensmittel-Unters Forsch.* 177(2); 1983; 94-6 (German)

The antimicrobial activity occurring in heated neutral glucose and fructose solutions was shown to result from phenolic di- or tri-hydroxy compounds. Twelve such compounds were identified in glucose solutions heated for 120 minutes at 120 C. The antimicrobial spectra of these compounds were also investigated. AA

- 636 FLINK (JM). Nonenzymatic browning of freeze-dried sucrose. *J. Food Sci.* 48(2); 1983; 539-42,

The appearance of nonenzymatic browning products in sucrose-based systems (5-20%; pH 1-5) during freeze drying and during subsequent room temperature storage in the dry state was investigated. Results showed that following the completion of the primary sublimation stage of drying, sucrose hydrolysis to glucose and fructose was initiated. Glucose and fructose undergo further breakdown, and at the same time products which absorb in the UV(280 nm) were formed. A short time later observable brown colours are noted (absorbance at 400 nm). The extent of UV absorbance and brown colour formation increased with decreasing sucrose concentration and decreasing pH in the initial solution. AA

- 637 HEINE (W), GASSMAN (B), and DRESCHER (U). Iron resorption from ferrous oligogalacturonate. *Nahrung.* 27(3); 1983; K15-K17 (German)

The solubility of added ferrous oligogalacturonate is more than doubled - from 0.13% to 0.27% - when an equal quantity of Mg(II) oligogalacturonate is added to milk; but this increase in solubility is not accompanied by increase in resorption of iron. When used in baby food, ferrous oligogalacturonate is no better than any other simple ferrous salt. KMD

- 638 TAM (SYT). A new calculation method for distinguishing endo- from exopolygalacturonases. *J. Food Sci.* 48(2); 1983; 532-3, 538

BAKERY PRODUCTS

- 639 HORST (M) and LANGGUTH (S). List of ingredients for baked products - (food law and labelling). *Getreide Mehl Brot.* 37(2); 1983; 60-63 (German)

A discussion of the "complete declaration of added substances" required under §§ 5 & 6 of the new Food Labelling Order of 22nd Dec. 1981, based on

the EEC Declaration Guideline of 1978, and the decision of the German Federal Constitutional Court relating to § 14 No.2 of the Cocoa Order. KMD

- 640 SEIBEL (W), BRUMMER (JM), MORGENSTERN (G) and BRETSCHNEIDER (F). Use of yellow linseed and pumpkin seed in baked products. *Getreide Mehl Brot*. 37(2); 1983; 47-55 (German)

Brown linseed has been traditionally used in dark-coloured breads, while the use of yellow linseeds in white breads is only a few years old. Recipes for small baked goods (rolls, buns, sliced bread) containing yellow linseed have been given. Some studies on the use of pumpkin seeds in baked products have also been completed. They can be added, without any difficulty, to mixed wheat-and-rye breads and also in certain fine baked goods (yeast rolls, yeast cakes, stollen). It is not possible to make pumpkin seed fillings, but fruit pies with pumpkin seeds can be made. KMD

- 641 ASP (EH) and MIDNESS (LT). Measuring alpha-amylase activity in yeast dough and bread. *Cereal Food World*. 28(12); 1983; 725-8

In research recently done at the University of Minnesota, St. Paul, the procedure used for flour sample preparation when measuring α -amylase activity by nephelometric method was modified to measure the enzyme activity in fermenting and baking doughs and bread. Researchers then determined the effects of these modifications on stability of the enzyme activity from cereal, fungal, or bacterial sources, and evaluated factors related to measurement of α -amylase activity by the nephelometer. AA

- 642 STAUFFER (CE). Dough conditioners. *Cereal Food World*. 28(12); 1983; 729-30

- 643 SEIBEL (W). "Alternative Baked Products" - Production and quality. *Getreide Mehl Brot*. 37(1); 1983; 7-13 (German)

Recent popular movements in favour of a "back to nature" life-style, have given rise to the production of the so-called "natural", or "biological", or "alternative" foods. According to the author, there is no significant difference between the "alternative" and "conventional" foods, in respect of nutritive value, health value, or suitability. The sensory value of the "alternative" products is, on the whole, lower, but this difference is being reduced year by year. Present methods of analysis do not indicate any difference between the so-called "alternative" and "conventional" products, so that the extra value attached to the former category is only the result of an idealization process. Some aspects of the labelling of "alternative" foods have been discussed with the aim of preventing deception of the customer. KMD

- 644 BRAND (C). Importance of delivery of flour in bulk for bakeries. *Getreide Mehl Brot*. 37(2); 1983; 45-7 (German)

Automation of bakery operations has been progressing in recent years; now-a-days flour is delivered in bulk to many bakeries that have constructed silos on their premises. This has led to a considerable decrease in the physical labour needed in individual bakeries, and completed the chain of high technology, automation, and rationalization in bakery operations. The flour mills must now play their part by giving sound technical advice, and adopting a united stand vis-a-vis the authorities. KMD

- 645 TEGGE (G), RICHTER (G), RICHTER (G) and HEINECKER (H). Enzymatic saccharification of starchy residues of the baking industry. Part I. Fundamentals of enzymatic degradation of starch-rich residues (or wastes) of the baking industry. *Getreide Mehl Brot*. 37(1); 1983; 17-20 (German)

As highly specific amylolytic enzymes are now being produced on an industrial scale, it is possible for the baking industry to use all its starch-rich residues (or wastes) as raw material for the direct enzymatic saccharification of starch. Thus, the costly process of isolation of the starch may be avoided, and the liquid glucose so obtained can be used as a sweetener in the baking unit itself. KMD

- 646 KHAN (MA) and MARTIN (JA). Salt content of selected snack foods. *J. Food Sci.* 48(2); 1983; 656-7

BREAD

- 647 FINNEY (KF). An optimized, straight-dough, bread-making method after 44 years. *Cereal Chem.* 61(1); 1984; 20-27

- 648 BARBER (S), de BENEDITO BARBER (C) and LLACER (Ma.D). Dietary fibre content, sensory attributes of quality, and chemical composition of commercial "whole wheat" bread. *Rev. Agroquim. Tecnol. Aliment.* 23(1); 1983; 119-31 (Spanish)

Neutral detergent fibre (NDF), acid detergent fibre (ADF), crude fibre (CF), cellulose (C) and lignin (L) contents of the following three types of commercial wheat bread were determined, viz:- (i) toasted, pan wheat bread from 20 bakeries; (ii) two commercial brands of bread; and (iii) ordinary white bread from 74% extraction flour. The results-which showed a wide range of fibre contents - were compared with those of whole wheat flour, 74% extraction wheat flour, and different sorts of bran, such as wheat bran, wheat mill run, and wheat middlings reported in an earlier paper in this journal (Vol.22, No.3, p. 431-440). Scores for the sensory characteristics of the breads - volume, colour, crust and crumb, texture, flavour, and overall acceptability - decreased as the fibre content increased. Changes of greatest magnitude were noted in the crumb structure, of intermediate magnitude in crumb texture and colour, and of least magnitude in volume and crust texture. Finally, the average composition and calorific values were also determined; the latter calculated as KJ/100 g dry matter were: 1516-1656 for (i); 1575 and 1633 for (ii) and 1602 for (iii). KMD

- 649 KAMEL (BS), WACHNUIK (S) and HOOVER (JR). Comparison of the baker compressimeter and the instron in measuring firmness of bread containing various surfactants. *Cereal Food World*. 29(2); 1984; 159-61

BISCUIT

- 650 VINCENT (MW). Manufacture of biscuits and confectionery products by extrusion cooking. *Confect. Prod.* 49(2); 1983; 107-8

COOKIES

- 651 ASSOLD (AW) and HOFENY (OC). Differential scanning calorimetry of sugar cookies and cookie doughs. *Cereal Chem.* 61(1); 1984; 34-7
Thermoanalytical studies with a differential scanning calorimeter showed three endotherms of cookie dough. Endotherms are identified as shortening-melting, sucrose-dissolving, and starch gelatinizing. Initiation of starch gelatinization was at temperatures above 100 C. Baked cookies also showed the gelatinization endotherm. Comparisons of endotherms of raw cookie dough and baked cookies indicated that only a small portion of starch was gelatinized during baking. AA
- 652 HOUJIAT (V) and IASIK (ME). Sugar-snap cookies prepared with wheat-navy bean-sesame seed flour blends. *Cereal Chem.* 61(1); 1984; 41-4
Sugar-snap cookies were prepared with 20 and 30% navy bean-sesame seed flours substituted for wheat flour. Navy bean-sesame combinations were: 20:0, 15:5, 10:10, 5:15, 0:20 for 20% substitutions, and 50:0, 20:10, 15:15, 10:20, and 5:20 (w/w) for 30% substitutions. Cookie spread and top grain scores were reduced as the percentage of navy bean and/or sesame flour increased. Cookies with 20 and 30% of sesame flour alone were tough, and more force was needed to compress and break them. The force required to break and shear the cookies decreased with increasing levels of navy bean flour. Cookies containing up to and including 20% navy bean flour were scored above 4 on a 7-point scale by most sensory panelists. Panelists gave low scores to the flavour of cookies containing more than 10% sesame flour. Cookies with 20% substitution had better baking properties and organoleptic characteristics than did those with 30% substitution. AA

CAKE

- 653 COLEMAN (TE) and HARBERS (CAI). High fructose corn syrup: Replacement for sucrose in angel cake. *J. Food Sci.* 48(2); 1983; 452-6
High fructose corn syrup (HFCS) (42% fructose) was used to replace 25, 50, 75 or 100% of the sucrose in angel cakes. Replacement with HFCS of 50, 75 or 100% of sucrose resulted in foams with lower specific gravities; decreased foam beating time; and cakes with lower volume, browner crusts, yellower crumb, firmer texture, and decreased sweetness. Replacement of 25% sucrose with HFCS did not affect greatly the physical measurements or sensory characteristics studied. AA
- 654 KAMEL (BS) and MAS-NOUK (S). Composition and sensory quality of shortening-free yellow layer cakes. *Cereal Food World.* 28(12); 1983; 751-5
- 655 OSBORNE (BC), FLEARN (T) and RANDALL (PG). Measurement of fat and sucrose in dry cake mixes by near infrared reflectance spectroscopy. *J. Food Technol.* 18(5); 1983; 451-6

PASTA

- 656 D'EGIDIO (MC). Investigations on properties related to pasta quality - changes in starch composition during production and cooking of pasta. *Getreide Wirt. Land. Bau.* 37(2); 1983; 55-60 (German)

The quality of a spaghetti - or similar paste product depends to the extent of 55% on its protein content - which is positively correlated to quality - and to the extent of 37% on its amylose content - which negatively correlated to quality. The processes employed in spaghetti manufacture bring about a degradation of the starch component in the product. The final quality is better, the lesser the degree of starch degradation; and it is more desirable that the amylose component be degraded, rather than the amylopectin component. KMD

CARDOSO (G) and LABUZA (TP). Prediction of moisture gain and loss for packaged pasta subjected to a sine wave temperature/humidity environment. *J. Food Technol.* 18(5); 1983; 587-604

The water vapour permeability (WVP) characteristics of paperboard, polypropylene, and polyethylene used for pasta were determined at 30 to 45 C and from 11 to 85% r.h. Both temperature and relative humidity affected the water vapour permeability of all the three films. Paperboard showed a greater WVP at 30 C compared to 45 C due to a higher moisture content which swells the matrix. Thus, it did not follow the typical Arrhenius relationship of a higher permeability at higher temperature. Polyethylene and polypropylene, on the other hand, showed a higher WVP as the temperature was increased. A second degree polynomial was fitted to predict the WVP of paperboard as a function of the ambient conditions. It was found that the creases and end openings on a typical paperboard box increase the overall transmission rate by two times over that of paperboard alone, therefore reducing the shelf life to half under adverse conditions. A dynamic mathematical model to predict mixture transfer for pasta packages under controlled unsteady state conditions of temperature and r.h. was developed and tested; good predictions were obtained. AA

CHEN (JY), BOHNSACK (K) and LABUZA (TP). Kinetics of protein quality loss in enriched pasta stored in a sine wave temperature condition. *J. Food Sci.* 48(2); 1983; 460-64

MILK AND DAIRY PRODUCTS

MILK

JOHNSTON (KA). A comparison of daily and composite analysis for fat, protein and lactose in raw milk. *NZ. J. Dairy Sci. Technol.* 18(2); 1983; 79-85

The fat, protein and lactose contents of 10-day composite samples were compared with those of fresh and preserved daily samples for the same 10-day period. Only small differences were found among the three types of samples. KAR

BAER (RJ), FRANK (JF) and LOEWENSTEIN (M). Compositional analysis of non-fat dry milk by using near infrared diffuse reflectance spectroscopy. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 858-63

Proximate data from 82 nonfat dry milk (NFD) samples were correlated with near infrared reflectance (NIR) measurements. The best wavelengths for determining constituent concentrations were chosen from 19 preselected filters by using linear regression analysis. The correlation coefficient (r)

was 0.971 and the standard error of prediction (SEP) was 0.274 when the predicted values (from NIR measurements) using the 3 wavelengths selected for determining moisture content were compared with laboratory values; r and SEP were 0.961 and 0.099, respectively, when the predicted values using the 4 wavelengths selected for fat content were compared with laboratory results; 0.887 and 0.594, respectively, using the 4 wavelengths selected for lactose content; 0.905 and 0.438 using the 8 wavelengths selected for protein (micro-Kjeldahl) content; and 0.911 and 0.509 using the 7 wavelengths selected for protein (dye binding). These data indicate that NIR can be used to estimate moisture, fat, lactose, and protein content of NFDM. AA

- 661 KIRST (E). On the lipolysis of milk due to technological influences. Part II. Studies on the effect of milk fat composition on lipolytic changes during milk cooling. *Nahrung*. 27(1); 1983; 1-8 (German)
- 662 DROESE (B). Separation and estimation of proteins of cow's milk. Part I. Chromatographic methods. *Nahrung*. 27(3); 1983; 273-8
- 663 DROESE (B). Separation and estimation of proteins of cow's milk. Part II. Electrophoretic methods. *Nahrung*. 27(3); 1983; 279-83
- 664 GAUCH (R), LEUENBERGER (U), LIMACHER (W), MULLER (U) and SCHALLIBAUM (M). The determination by thin layer chromatography by pyrantel in cow's milk and blood serum after oral administration of banminth. *Z. Lebensmittel-Unters. Forsch.* 177(2); 1983; 117-20 (German)
- 665 SATTAR (A), TAVANGER (K) and AHMED (S). Effect of packaging materials on photochemical changes in buffalo milk. *Z. Lebensmittel-Unters. Forsch.* 177(2); 1983; 121-3

Liquid buffalo milk was packed in four different types of containers. The packing materials were clear glass, green glass, amber glass and a coextruded wax-laminated paper (Tetra-Pak). These samples, along with exposed and unexposed controls, were kept at 5-6 C and 16-24 C for 24 and 16 hours, respectively. Chemical analysis revealed significant effects of the packages and light on ascorbic acid contents of milk ($P < 0.01$). Brown glass gave the best protection followed by Tetra-Pak, green and clear glass bottles. Sensory testing of milk samples also showed a congruent pattern of flavour changes in relation to the packing materials tested. AA

- 666 ENTIS (P). Enumeration of coliforms in nonfat dry milk and canned custard by hydrophobic grid membrane filter method. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 897-904
- A collaborative study was conducted in 14 laboratories to evaluate the performance of the hydrophobic grid membrane filter method against the official final action method, 46.016, for enumeration of coliforms in foods. Twelve artificially contaminated samples of nonfat dry milk and canned custard were analyzed by each laboratory. The random errors (S_R^2) associated with the hydrophobic grid membrane filter method were significantly lower than those of the official method, and the counts obtained by the new method fell within the 95% confidence interval of the reference method. The coliform counts obtained by the hydrophobic grid membrane filter method did not differ significantly from those obtained by the reference method as measured by a 3-way analysis of variance. AA

- 667 GILLILAND (SE) and EWELL (HR). Influence of combinations of *Lactobacillus lactis* and potassium sorbate on growth of psychrotrophs in raw milk. *J. Dairy Sci.* 66(5); 1983; 974-80

- 668 CHANG (HL) and DEVRIES (JW). Rapid high pressure liquid chromatographic determination of aflatoxin M₁ in milk and nonfat dry milk. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 913-7

A modification of the current revised AOAC method, 26.A 10-26.A 15, is described for the rapid analysis of aflatoxin M₁ in milk and nonfat dry milk. The method incorporates chloroform extraction and eliminates the need for column chromatography by using liquid-liquid partition for sample extract cleanup. Quantitation is carried out by using fluorescence detection combined with high pressure liquid chromatography (HPLC) of aflatoxin M₁ which has been converted to aflatoxin M_{2a} with trifluoroacetic acid. The method has a detection limit of 0.014 µg/L (2 x signal/noise) for whole milk. For 6 samples of naturally contaminated nonfat dry and freeze-dried milk, the modified method gave an average result of 0.698 µg/L; the AOAC method gave an average result of 0.386 µg/L. AA

- 669 SINGH (V), HSU (CC), CHEN (DC) and TZENG (CH). Fermentation processes for dilute food and dairy wastes. *Process. Biochem.* 18(2); 1983; 13, 16-7, 25

YOGHURT

- 670 WILSON (CA), RICHTER (RL) and DILL (CW). Sweetness of sucrose in unflavoured yoghurt by magnitude estimation. *J. Dairy Sci.* 66(5); 1983; 994-6

WHEY

- 671 HOSSAIN (M), BROOKS (JD) and MADDOX (IS). Production of citric acid from whey permeate by fermentation using *Aspergillus niger*. *NZ J. Dairy Sci. Technol.* 18(2); 1983; 161-8

Using whey permeate as substrate, a citric acid concentration of 8.3 g/l (yield 19% w/w), has been observed. Supplementation of permeate with lactose increased the yield. Addition of methanol increased citric acid production to 25 g/l. KAR

CHEESE

- 672 AGBEVAVI (T), ROULEAU (D) and MAYER (R). Production and quality of cheddar cheese manufactured from whole milk concentrated by reverse osmosis. *J. Food Sci.* 48(2); 1983; 642-3

Pasteurized whole milk was concentrated by reverse osmosis (RO) on a pilot plant scale. The retentate was then used to produce cheddar cheese following the traditional method but using 50% less starter and 60% less rennet. The biochemical composition of the RO cheese was close to that of ordinary cheddar. The resulting non uniformity of the fresh curd as well as the granular texture of the cheese were probably due to the high lactose content of the retentate. Contamination of the milk from bacteria already present in the reverse osmosis system caused the high coliform level of the cheese. AA

- 673 KINDSTEDT (PS), MATTICK (LR) and KOSIKOWSKI (FV). Simple selective sodium ion electrode measure of sodium in cheese. *J. Dairy Sci.* 66(5); 1983; 988-93

- 674 SANDHU (DK) and WARAICH (MK). Conversion of cheese whey to single-cell protein. *Biotechnol. Bioeng.* 25(5); 1983; 797-808

Thirteen yeast species belonging to nine genera were screened for the production of single-cell protein (SCP) using cheese whey as the substrate. Cheese whey supplemented with minerals and yeast extract proved to be the best medium for yield, lactose utilization, biomass production, and conversion efficiency. Production of β -galactosidase was studied in *Brettanomyces anomalus*, *Kluyveromyces fragilis*, *Trichosporon cutaneum*, and *Wingea robertsii*; the last proved to be the best strain combining high yield with shorter incubation period. AA

- 675 YANG (CST) and CHERYAN (M). Rheological properties of a progel formed from a soy-gelatin mozzarella cheese analog. *J. Texture Stud.* 14(2); 1983; 125-42

Progels formed from aqueous dispersions of an imitation mozzarella cheese containing soy protein isolate, gelatin, fat and GFS gum (mixture of xanthan, guar and locust bean gums) at a total solids of 8% w/v exhibited pseudoplastic behaviour. The data could be fitted to the power law equation for shear rates above 100 s⁻¹. Below this shear rate, deviations from the model were observed such that the experimental apparent viscosity (v_a) was greater than the predicted v_a values. At 25 C, the Progel's power law consistency coefficient (K) and v_a increased with increasing gelatin content and/or decreasing soy isolate content while the power law index (n) decreased. The reverse occurred when measurements were made at 40, 60 and 80 C. Soft gels formed when the progels were aged for 24 hours at 4 C. Texture profile analysis and electron micrographs of the gel further emphasized the role of individual components in structural integrity and molecular interactions. AA

ICECREAM

- 676 ADAM (R). Quality evaluation of ice-cream. *Dtsch. Lebensmittel-Rundschau.* 79(2); 1983; 39-45 (German)

Ice-cream is used as an example to show that the quality of a food product depends on many individual parameters, each contributing to the overall quality to a different degree. A distinction has been made between internal and external quality characteristics, and its significance has been discussed. Some examples of suitable test methods, and some of the results obtained by the author have been indicated. Finally, a possibility of describing the storability of ice-cream with the help of numbers, has been presented. KMD

MEAT AND POULTRY

- 677 NIELSEN (H-JS). Influence of nitrite addition and gas permeability of packaging film on the microflora in a sliced vacuum-packed whole meat product under refrigerated storage. *J. Food Technol.* 18(5); 1983; 573-85

- 678 NADAI (BT). Preliminary experiments for measuring meat composition by near infrared reflection technique. *Acta Aliment.* 12(2); 1983; 119-30

A Neotec 6450 type Research Composition Analyzer (spectrocomputer) was used for the experiments. The $\log(I/R')$ spectra of the homogenized meat samples were measured through the glass window of the sample cell in the 1100-2500 nm wavelength region. At a sample thickness of 10 mm the influence of the variable on the $\log(I/R')$ spectra can be kept below $3 \cdot 10^{-3}$. The effect of sample position on the $\log(I/R')$ spectra has also proved to have a maximum of $3 \cdot 10^{-3}$. A change in the temperature of the sample caused an almost parallel shift in the spectrum. One °C caused a shift of about $5 \cdot 10^{-3}$ in the $\log(I/R')$ value. Uneven chopping of the meat was found to cause the greatest disturbance estimated to be about several times 10^{-2} . The methodology of spectrum measurement has been specified on the basis of these observations. The reproducibility, which also contains the error derived from sample preparation, was determined and was characterized by the standard deviation spectrum (its value up to 2,300 nm is below $4 \cdot 10^{-2}$). The error derived from the spectrophotometer: the repeatability also characterized by a standard deviation spectrum has a value of about $5 \cdot 10^{-3}$. It was found that the error in spectrum measurement increases substantially over 2,300 nm. It is unlikely that wavelengths suitable for composition measurement will be found in this range. The effect of several sources of error appears as an almost a parallel shift in the spectrum; thus, the majority of such errors can probably be compensated for by a suitable spectrum transformation. Finally, to illustrate the dependence of the meat spectrum on composition, the spectra of mixtures of muscle and adipose tissues (in 20 mass % steps) are shown. AA

- 679 CASSENS (RG), EDDINGER (TJ) and CARPENTER (CE). Implications to meat quality-control via nervous and hormonal systems. *J. Food Biochem.* 7(3); 1983; 179-84

The article discusses the role of nervous/or hormonal systems in live animals and the need for development of control procedures, so that the desired quality of meat may be obtained from them for being processed into various food products. BSN

- 680 GOLL (DE), OTSUKA (Y), NAGAINIS (PA), SHANNON (JD), SATHE (SK) and MUGURUMA (M). Role of muscle proteinases in maintenance of muscle integrity and mass. *J. Food Biochem.* 7(3); 1983; 137-77

Current evidence indicates that, of the thirteen known lysosomal peptide hydrolases, only seven, cathepsins A, B, C, D, H, L, and lysosomal carboxypeptidase B are located inside skeletal muscle cells. Only one of the reported neutral and alkaline proteases is located inside skeletal muscle cells; this neutral protease is the Ca^{2+} - dependent proteinase, CAF. With the possible exception of cathepsin N, which can degrade collagen, it seems probable that any protease that contributes to postmortem tenderization needs to be located inside muscle cells. Because very little degradation of myosin or actin occurs in postmortem muscle, most of the small amount of proteolytic degradation of the myofibrillar proteins that occurs during postmortem storage must be due to CAF which is unique in being unable to degrade myosin and actin. It is not certain that postmortem proteolysis by CAF causes increased tenderness; some recently discovered actin-fragmenting proteins could be involved. AA

- 681 MILLS (BL), VAN DE VOORT (FR) and USBORNE (WR). Mojonnier method as reference for infrared determination of fat in meat products. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 1048-50

The Mojonnier method was compared with the conventional Soxhlet method for the determination of fat in 7 different meat products to assess its use as a standard reference method for calibration of commercial quantitative infrared transmission analyzers (e.g., Multispec M, Milkoscan 300 or 104). Results for the meat samples obtained by the Mojonnier method did not differ significantly from those obtained by the Soxhlet method. In addition, the Mojonnier method was less time-consuming and more precise than the Soxhlet; therefore, it can be used as a standard reference procedure for the calibration and assessment of infrared milk analyzers in their potential application to the rapid determination of fat in meat and meat products. AA

- 682 WHITTAKER (RG), SPENCER (TL) and COPLAND (JW). An enzyme-linked immunosorbent assay for species identification of raw meat. *J. Sci. Food Agric.* 34(10); 1983; 1143-8

This assay is capable of differentiating horse, beef, sheep, camel, pig and kangaroo meats. The advantages of this method are listed and the method will reduce significantly the cost of meat identification in large-scale testing. KAR

- 683 GOLOVNYA (RV), MISHARINA (TA), GARBUZOV (VG) and MEDVEDYEV (FA). Volatile sulphur containing compounds in simulated meat flavour and their comparison with the constituents of natural aroma. *Nahrung.* 27(3); 1983; 237-49

The composition of sulphur containing compounds in simulated meat flavour goods for food industry and obtained through Maillard reaction from bakery yeast autolysate was studied for the first time. Gas chromatographic analysis on a series of four columns of different polarity identified 37 compounds and structure of 13 from them were confirmed by mass spectrometry. 9 sulphur substances have been previously reported either for model systems or natural meat products. It was found that two from four gas chromatographic fractions reminiscent cooked meat aroma correspond to boiled beef. All these fractions were characterized by retention indices and odour description. 25 of the identified sulphur compounds were shown to be also inherent for various meat products. AA

BEEF

- 684 SACHON (G). Cattle slaughter houses - waste water and their treatment. *Ind. Aliment. Agric.* 100(3); 1983; 179-84 (French)

The pollution load in the waste waters of cattle slaughter-houses arises mainly from fat (COD) and faeces (nitrogen). The recovery of these products, at the earliest possible stage in the processing line would lead to a technically and economically optimal treatment of the waste water. KMD

- 685 BOWLES AXE (JE), KASTNER (CL), DIKEMAN (ME), HUNT (MC), KROPF (DH) and MILLIKEN (GA). Effects of beef carcass electrical stimulation, hot boning, and aging on unfrozen and frozen longissimus dorsi and semimembranosus steaks. *J. Food Sci.* 48(2); 1983; 332-6

- 686 NAEWBANIJ (JO), HARRISON (DL) and STONE (MB). Roasting versus cooking in a model system: Tenderness of bull adductor muscle, conventionally chilled or electrically stimulated-hot boned. *J. Food Sci.* 48(2); 1983; 337-42

- 687 SLEPER (PS), HUNT (MC), KROPF (DH), KASTNER (CL) and DIKEMAN (ME). Electrical stimulation effects on myoglobin properties of bovine longissimus muscle. *J. Food Sci.* 48(2); 1983; 479-83
- 688 MILLER (RK), TATUM (JD), CROSS (HR), BOWLING (RA) and CLAYTON (RP). Effects of carcass maturity on collagen solubility and palatability of beef from grain-finished steers. *J. Food Sci.* 48(2); 1983; 484-86, 525
- 689 GRAU (FH). Microbial growth on fat and lean surfaces of vacuum packed chilled beef. *J. Food Sci.* 48(2); 1983; 326-8, 336
- 690 WING (PL), YADA (RY) and SKURA (BJ). Electron microscopic investigation of *Pseudomonas fragi* ATCC 4973 on intact and sarcoplasm-depleted bovine longissimus dorsi muscle at 21 C. *J. Food Sci.* 48(2); 1983; 475-78, 500
- 691 HOWAT (PM), SIEVERT (LM), MYERS (PJ), KOONCE (KL) and BIDNER (TD). Effect of marination upon mineral content and tenderness of beef. *J. Food Sci.* 48(2); 1983; 662-3

The study compared marinated and nonmarinated beef to determine differences in semimembranosus muscle tenderness and selected mineral content. The minerals analyzed were iron, zinc, magnesium and sodium. Marination resulted in a significantly more tender muscle, as determined by shear values and trained panel evaluations. Mineral content was significantly affected by marination with substantial losses of iron, zinc, and magnesium and increased sodium. Marination would be a feasible method of enhancing tenderness of more economical cuts of beef; however, the subsequent loss and/or gain of minerals should be considered. AA

- 692 MURRAY (AC), JEREMIAH (LE) and MARTIN (AH). Muscle fibre orientation and its effect on measurements of tenderness of bovine longissimus dorsi muscle. *J. Food Technol.* 18(5); 1983; 607-17
- 693 RAY (EE), BERRY (BW), LOUCKS (LJ) and LEIGHTON (EA). Influence of rate and length of cookery upon product attributes of pre- and post-rigor beef. *J. Food Sci.* 48(2); 1983; 343-5, 359
- 694 RIFFERO (LM) and HOLMES (ZA). Characteristics of pre-rigor pressurized versus conventionally processed beef cooked by microwaves and by broiling. *J. Food Sci.* 48(2); 1983; 346-50, 374
- 695 RHEE (KS), SMITH (GC) and RHEE (KC). Retardation by glandless cottonseed flour of lipid oxidation and discolouration in raw ground beef containing salt. *J. Food Sci.* 48(2); 1983; 351-52, 359

Salt (NaCl) was added to raw ground beef at levels of 0, 0.5, 1, 2 or 3% of the weight of the meat and defatted glandless cottonseed flour (GCF) was added at 0 or 3% levels. Patties were made with these mixes and stored for 3 or 6 days at 4 C or for 30 or 60 days at -20 C. Lipid oxidation (TBA values) in samples stored at 4 and -20 C and discolouration in samples stored at 4 C were determined. In samples made with salt only, TBA values within each storage period for each storage temperature increased with increasing salt levels up to 2%; increasing salt from 2 to 3% decreased TBA values. GCF markedly reduced TBA values at each salt level. Discolouration of samples stored at 4 C was also decreased by GCF. AA

MUTTON

- 696 KIRTON (AH), WINGER (RJ), DOBBIE (JL) and DUGANZICH (DM). Palatability of meat from electrically stimulated carcasses of yearling and older entire-male and female sheep. *J. Food Technol.* 18(5); 1983; 639-49

PORK

- 697 LANZA (E). Determination of moisture, protein, fat, and calories in raw pork and beef by near infrared spectroscopy. *J. Food Sci.* 48(2); 1983; 471-4

POULTRY

- 698 HAMM (D) and YOUNG (LL). Further studies on the composition of commercially prepared mechanically deboned poultry meat. *Poult. Sci.* 62(9); 1983; 1810-15

Mechanically deboned poultry meat (MDPM) from several areas in the United States produced by three different deboning machines was obtained from commercial plants and analyzed for proximate composition, purines, and amino acids. Adenine, guanine, and xanthine levels were very similar to those found in poultry breast and thigh meats. Hypoxanthine was lower in MDPM than what has been reported in breast or thigh. The amino acid profile was also similar to the typical animal muscle amino acid profile except MDPM contained about 0.3% hydroxyproline. This level of hydroxyproline indicates that 2.3% collagen was present in the MDPM. Proximate composition values ranged from 62.2 to 70.0% moisture, 13.8 to 22.9% fat, and 11.9 to 16.7% protein.
AA

- 699 CORRAO (PA), MALANOSKI (AJ), CURRY (KA) and GLOVER (A). Titrimetric determination of calcium in mechanically separated poultry and beef. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 989-92

A collaborative study was conducted on a titrimetric EDTA method for the determination of calcium in mechanically separated poultry and beef tissue. Six laboratories analyzed, as blind duplicates, 5 poultry samples and 5 beef samples. Calcium concentrations covered the levels from 0.04 to 0.82%. Pooled standard deviations were 0.0165 for repeatability, 0.0072 for bias, and 0.0225 for reproducibility. The method has been adopted official first action. AA

- 700 MAWSON (RF), MILLER (BF) and SCHMIDT (GR). Studies on pasteurized and commercially sterilized poultry meat bologna. Effects of chopping condition and meat type. *J. Food Sci.* 48(2); 1983; 317-21, 325
- 701 MAWSON (RF), MILLER (BF) and SCHMIDT (GR). Studies on pasteurized and commercially sterilized poultry meat bologna. Effects of nitrite addition and vacuum cutting. *J. Food Sci.* 48(2); 1983; 322-5
- 702 PADDA (GS). Flaking - a new method of comminution for reformed poultry meat products. *Poult. Guide.* 20(8); 1983; 45-6
- A brief description is given of the new flake cutting - the Urschel Comitrol. Dark meat, white meat, and skin are flaked separately and then

blended and pressed or extended, and diced. The flakes laminate together into compact, cohesive, solid meat products that do not disintegrate even during or after cooking. Restructured products from flaked poultry meat have the "solid muscle texture" and "meaty bite" of a steak. Textured soy products, and the like, may be added during the stage of blending or extrusion. KMD

- 703 AUBART (CH) and FAUCHILLE (S). Anaerobic digestion of poultry wastes. Part I. Biogas production and pollution decrease in terms of retention time and total solids content. *Process. Biochem.* 18(2); 1983; 31-4; 37

CHICKEN

- 704 BEDDOWS (CL). A comparison of temperature reached after cooking stuffed chickens: Implications for preventing food poisoning. *J. Sci. Food Agric.* 34(10); 1983; 1149-53

Methods of cooking were investigated to determine their ability to heat stuffing in the cavity of chickens. Based on the results, it is recommended that stuffed chickens should not be cooked in pressure cookers or in microwave ovens. Cooking times for electric fry pans should be marginally increased when the chicken is stuffed. A stuffed chicken, held at a low temperature prior to roasting should be given a longer period of cooking in a conventional oven. KAR

- 705 GRAY (TC), ROBINSON (D), JONES (JM), STOCK (SW) and THOMAS (NL). Effect of age and sex on the composition of muscle and skin from a commercial broiler strain. *Br. Poult. Sci.* 24(2); 1983; 219-231

TURKEY

- 706 MEAD (GC), GRIFFITHS (NM), JONES (JM), GREY (TC) and ADAMS (BW). Effect of gas-packaging on the keeping quality of turkey breast fillets. *Food Sci. + Technol.* 16(3); 1983; 142-6

The keeping quality of turkey breast fillets stored for 3 weeks at 1°C in vacuum packs and in packs containing 30% CO₂ in N₂ was comparable. Although the ultimate "off" odours were different in each case, there was little difference in the predominant spoilage microflora (mainly "atypical Lactobacilli") found in the two types of packs. Incorporation of 10-20% O₂ in gas packs containing 20-30% CO₂ - in order to enhance meat colour during storage - led to rapid development of unpleasant flavours in the cooked meat. Muscle hypoxanthine increased during storage in all types of packs, but the rate of hypoxanthine production depended on the gaseous composition of the environment. In vacuum packs, high concentrations of hypoxanthine occurred at pH-values ≥ 6.0 . KMD

EGG

- 707 FOOD RESEARCH REPORT: Food Research - Review of the biennial report, 1979/80 of the Food Research Institute, (Agricultural Research Council). *Br. Food J.* 85(913); 1983; 40-43
- Discusses: rapeseed meal and egg taint; dietary fibre; egg pasteurisa-

tion; microbiology of food; toxicants; research into food treatment and preparation; hygiene investigation; basic bacterial physiology of food micro-organisms. BSN

- 708 ARAFA (AS). Quality characteristics of eggs further processed by pickling as influenced by packaging material and storage temperature. *Poult. Sci.* 62(7); 1983; 1231-40

Eggs were pickled in 3 different pickling solutions and stored at 2 or 25 C over one year after packing in polyester/polyethylene/glass jars. Better overall acceptability scores were observed for pickled eggs packaged in flexible pouches when compared to those eggs packaged in conventional glass jars.

- 709 WOODWARD (SA) and COTTERILL (OJ). Electrophoresis and chromatography of heat-treated plain, sugared and salted whole egg. *J. Food Sci.* 48(2); 1983; 501-6

The effects of heat treatments on the proteins in plain, 10% sugared and 10% salted whole egg were studied by polyacrylamide disc gel electrophoresis and diethylaminoethyl-Sephacel ion exchange chromatography. Electrophoretograms of products heated from 57-87 C for 3.5 minutes showed a wide range of protein stability. Livetins and some globulins were most heat sensitive, while conalbumin and ovalbumin were most stable. Sugar and salt increased heat stability of proteins by 1.6 and 7.9 C, respectively. Heat sensitive proteins were most stabilized by sugar and salt. Heating whole egg and sugared whole egg changed the chromatograms substantially, while heating salted whole egg caused fewer changes. AA

- 710 WAKAMATU (T), SATO (Y) and SAITO (Y). On sodium chloride action in the gelation process of low density lipoprotein (LDL) from hen egg yolk. *J. Food Sci.* 48(2); 1983; 507-12, 516

Gelation of 40% LDL solution with 1~10% NaCl was inhibited during frozen storage at -20 C and 25 C. Frozen storage of LDL solutions with more than 4% NaCl at -30 C, -40 C and -60 C induced the gelation, whereas gelation was inhibited by addition of 1 and 2% NaCl at temperatures lower than -30 C. Differential scanning calorimetry analyses revealed that when NaCl acts as an inhibitor of gelation, it increased the unfrozen water in the LDL solutions through formation of LDL-water-NaCl complex where the water is hardly frozen; and when it acts as an accelerator of gelation, it promoted removal of water from the complex. AA

- 711 BAKER (RC), HOGARTY (S), POON (W) and VADEHRA (DV). Survival of *Salmonella typhimurium* and *Staphylococcus aureus* in eggs cooked by different methods. *Poult. Sci.* 62(7); 1983; 1211-16

Shell eggs inoculated with *Staphylococcus aureus* and *S. typhimurium* were cooked by different methods. Boiling for 7 minutes was necessary for complete destruction of *S. typhimurium* and it took 12 minutes of boiling to destroy *S. aureus*. Cooking time-temperature relationship for complete kill depended on the cooking method with fried eggs. Four minutes and 70 C were needed for covered eggs, 3 minutes on each side at 64 C for thermal over eggs, while cooking for 7.5 minutes at 64 C for sunnyside eggs was not sufficient for destruction of both the test organisms. None of the test organisms could be recovered from omelets baked by the recommended procedure (86 C for 25 minutes). Scrambling for 1 minute at 74 C was required for the complete destruction of *S. typhimurium* and 2 minutes at 78 C for *S. aureus*. KAR

- 712 TRANTER (HS), SPARKS (NHC) and BOARD (RG). A note on the structure and iron-binding properties of egg-shell membranes. *Br. Poult. Sci.* 24(1); 1983; 123-30
- 713 RIED (R). The use of the plasma chemistry unit as an aid to the scanning electron microscope study of avian egg-shell structure. *Br. Poult. Sci.* 24(2); 1983; 233-5
- 714 BRUCE (J) and DRYSDALE (EM). The bacterial flora of candling-reject and dead-in-shell turkey eggs. *Br. Poult. Sci.* 24(3); 1983; 391-5
 The incidence of bacterial contamination in turkey eggs which were rejected at candling or were "dead in shell" was about 4%. This incidence was lower than that previously found in chicken eggs. Analysis of the bacterial flora indicated that the proportion of *Enterobacteriaceae* was higher and the proportion of *Micrococcus* spp. lower in turkey eggs. AA
- 715 BABU (M). Preservation of shell eggs. *Poult. Guide.* 20(10); 1983; 43
 A brief notes on preserving eggs in the shell, by refrigeration, oiling, waxing, storage under CO₂, liming, and thermostabilization. KMD
- 716 SINGH (RRP), CHOUDHARY (SP), VERMA (SK) and PRASAD (NN). Studies on the external quality of farm and market eggs. *Poult. Guide.* 20(8); 1983; 81-83
 The external qualities like egg weight (g), shape index, specific gravity, and shell thickness (mm) of eggs collected from the experimental poultry farm of the Ranchi Veterinary College and from retail shops in and around Ranchi city, were studied. The eggs from the experimental farm had a higher average weight and specific gravity than the market eggs; the market desi (eggs of Indian breeds) were superior in shape index. Market exotic eggs (eggs from exotic breeds) had a better appearance and shell thickness than the others. KMD

SEAFOODS

- 717 FIK (M). Adaptation of Pope and Stevens methods for rapid assessment of proteolytic enzymes activity and protein hydrolysis intensity in raw materials of marine origin. *Nahrung.* 27(1); 1983; 15-9

FISH

- 718 ANON. Continuous sterilization of fish. *Gordian.* 83(3); 1983; 43-4 (German)
 The Alco S.p.A. in Bari, a leading Italian processor of tuna, has recently installed a new Stork-Kontinu-Sterilizer in its factory. The advantages of the equipment, which has helped to modernize the plant and improve its production efficiency, have been described. KMD
- 719 WATANABE (E), ANDO (K), KARUBE (I), MATSUOKA (H) and SUZUKI (S). Determination of hypoxanthine in fish meat with an enzyme sensor. *J. Food Sci.* 48(2); 1983; 496-500
 An enzyme sensor specific for hypoxanthine (Hx) was developed using immobilized xanthine oxidase-membrane and an oxygen probe. Xanthine oxidase (E.C. 1.2.3.2.) was covalently immobilized on a membrane prepared from

cellulose triacetate, 1,8-diamino-4-amino-methyloctane, and glutaraldehyde. Hx is oxidized to uric acid by the immobilized enzyme, the output current of the oxygen probe decreasing due to oxygen consumption. A linear relationship was obtained between current decrease and Hx concentration in the range 0.06-1.5 mM. The enzyme sensor could be used for more than 100 assays without decrease of output current. After 30-day-storage at 5 C, no remarkable decrease of output current was observed. The enzyme sensor system was applicable to the simple, rapid, and economical determination of Hx in several fish meats including sea bass, saurel, mackerel, yellowfish, and flounder. AA

- 720 TOYAMA (K), HOSHI (M), KAMIYAKA (Y), OHTAKA (T), YAMAZAKI (M) and AOE (H). Amino acid composition of fish meals and fish solubles prepared from putrefied raw fish. *Bull. Jpn. Soc. Sci. Fish.* 49(8); 1983; 1221-31 (Japanese)

With the putrefaction of raw fish, the amounts of total, individual and essential amino acids decreased in the fish meal fraction, while those in the fish solubles fraction and its related products, whole meals increased. A similar tendency was also observed in the total N contents of the same samples. These results indicate that the degree in the destruction of fish proteins, reflects upon the distribution pattern of the N compounds, especially amino acids, between solid fraction and liquid fraction at the cook/press stage. KAR

- 721 FLOR (PQ) and HAYASHIDA (S). Continuous production of high-glucose syrup by chitin immobilized amylase. *Biotechnol. Bioeng.* 25(8); 1983; 1973-80

A simple method of preparing chitin-immobilized- α -amylase and glucoamylase from protease and glycosidase-less mutant KF-15 of *Aspergillus awamori* variety Kawachi has been developed and employed for production of high-glucose syrup. The characterisation, activity and storage period have been reported. BSN

SARDINE

- 722 TANAKA (M), SUZUKI (K) and TAGUCHI (T). Glucose level of canned sardines. *Bull. Jpn. Soc. Sci. Fish.* 49(7); 1983; 1155

The glucose level of raw meats increased significantly with storage. Average loss rates of glucose during the sterilization of canned sardines were 58.6% for 0-day cans, 71.4% for 3-day cans, 74.1% for 6-day cans, and 77.7% for 11-day cans. The glucose level in the liquid also increased with the ice-storage period. KAR

RAINBOW TROUT

- 723 LOVELAND (PM), COULOMBE (RA), LIBBEY (LM), PAWLOWSKI (NE), SINNHUBER (RO), NIXON (JE) and BAILEY (GS). Identification and mutagenicity of aflatoxicol-M₁ produced by metabolism of aflatoxin B₁ and aflatoxicol by liver fractions from rainbow trout (*Salmo gairdneri*) fed β -naphthoflavone. *Food Chem. Toxicol.* 31(5); 1983; 557-562

β -naphthoflavone (BNF) fed to Rainbow Trout at 50 or 500 ppm in the diet modified the *in vitro* metabolism of aflatoxin B₁ (AFB₁) by the mitochondrial fractions of liver (PMF). A new metabolite 4 hydroxy aflatoxicol (aflatoxicol M₁) was also noticed in small amounts in PMF metabolism of BNF fed trouts. JVS

CARP

- 724 MATSUDA (Y). Influence of oxidation on the protein denaturation of lyophilized carp myofibrils during storage. *Bull. Jpn. Soc. Sci. Fish.* 49(7); 1983; 1117-9 (Japanese)

The influence of oxidation on the quality change of lyophilized carp myofibrils during storage was estimated. Carp myofibrils were ground with sucrose and polyphosphates. The mixtures were freeze-dried at 35 C, ground into powder, wrapped up in paraffin paper, and put into gas washing bottles. By rotary pumping out of the air for 10 minutes, vacuum was produced in each bottle containing the powder. Later, bottles were filled with nitrogen, carbonic acid, hydrogen and oxygen gases respectively, repeating the same vacuumization procedure and tightly stopped with vacuum stopcocks and stored at 20 C for one year. At suitable intervals, aliquots of the powders were taken out and examined as to the quality, using as indexes solubility in 0.6 M KCl, relative viscosity and ATPase activity of 0.6 M KCl extractable protein, and the total ATPase activity. The powders stored in carbonic acid and nitrogen gases and in vacuum condition were of a little superior quality in the descending order but the qualities of all powders including those stored in hydrogen and oxygen gases were acceptable through the storage period. It was found that the lyophilized myofibrils are little influenced by oxygen, provided they are stored in low humidity and at normal temperature. AA

COD

- 725 REECE (P). The role of oxygen in the production of formaldehyde in frozen minced cod muscle. *J. Sci. Food Agric.* 34(10); 1983; 1108-12

It was shown that during frozen storage of cod muscle, the production of formaldehyde is inhibited near the surface of the mince. Production of formaldehyde is inhibited by both oxygen and potassium cyanide and activated by reduced nicotinamide dinucleotide. KAR

WHITING

- 726 STOUT (VF) and CARTER (G). Ames test for mutagenicity on Pacific whiting treated with hydrogen peroxide. *J. Food Sci.* 48(2); 1983; 492-5

MACKEREL

- 727 PAUL (JKe), CERVANTE (E) and ROBLES-MARTINEZ (C). Effectiveness evaluation for a non-absorbable antioxidant (Anoxomer) using a high PUFA lipid system. *J. Sci. Food Agric.* 34(10); 1983; 1154-8

The experiment carried out with the PUFA mackerel skin-model lipids with accelerated oxidation at 60 C has shown that the order of effectiveness for inhibiting the oxidation was found to be TBHQ > Anoxomer > BHA > BHT at the concentration of 0.02% in the tested model lipids. In addition, Anoxomer was also shown to slightly reduce the formation of FFA and carbonyls. The effectiveness of Anoxomer at the level of 0.05-0.10% is recommended for the highly unsaturated lipids and related food products. KAR

TUNA

- 728 SEET (ST), HEIL (JR), LEONARD (SJ) and BROWN (WD). High vacuum flame sterilization of canned diced tuna: Preliminary process development and quality evaluation. *J. Food Sci.* 48(2); 1983; 364-9, 374

A preliminary study of the potential of high vacuum flame sterilizing canned diced tuna was carried out. The investigation included inoculated experimental sighting packs study at five process levels, and comparative assessment of the physical, chemical and nutritional property of the raw, precooked, high vacuum flame sterilized (HVFS) and still-retorted canned tuna. The vacuum achieved in the HVFS packs was significantly higher ($P < 0.05$) than the control packs. Fatty acid and amino acid composition, *in vitro* protein digestibility, and the Computed Protein Efficiency Ratio (C-PER) were similar for the raw, precooked and canned tuna. Available lysine was marginally decreased by precooking, and HVFS processing caused no measurable change. However, available lysine, thiamine, riboflavin, niacin and mineral concentrations were generally lower in the retort process control canned tuna. AA

ROCKFISH

- 729 LUNDSTROM (RC). Identification of Pacific rockfish (*Sebastes*) species by isoelectric focusing. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 974-80

ANTARCTIC FISH

- 730 MANTHEY (M) and OEHLenschLAGER (J). Sensory evaluation of frozen stored fillets from Antarctic fishes. *Food Sci. + Technol.* 16(3); 1983; 772-5 (German)

Fillets of three species of Antarctic Fish (*Notothenia neglecta*, *Notothenia rossii marmorata* and *Chaenocephalus aceratus*) were stored at -32 C and evaluated by a taste panel in different time intervals. The ice-fish *Ch. aceratus* maintained a high quality during the 18 months of investigation. *N. rossii marmorata* was found to be somewhat inferior in this respect owing to its taste while *N. neglecta* reached the limit of acceptability after 12 months of storage. AA

SHELLFISH

LOBSTER

- 731 OGAWA (M), KUROTSU (T), OCHIAI (I) and KOZIMA (TT). Mechanism of black discolouration on spiny lobster tails stored in ice. *Bull. Jpn. Soc. Sci. Fish.* 49(7); 1983; 1065-75

Traumatism in stored spiny lobster tails in the alive state is a principal factor of discolouration and usually happens one day after storage. Absence of air-oxygen acted as an inhibiting factor with retarding effect, even if traumatism was present in the alive state. KAR

CRAB

- 732 AMAN (MB), MOUSTAFA (EK), ZOUEIL (ME) and GHALY (MH). Effect of frozen storage on the chemical and technological characteristics of Egyptian crab meat. *Z. Lebensmittel-Unters. Forsch.* 177(2); 1983; 93-100

Effects of frozen storage at -10 C on the chemical and technological characteristics of one of the famous red Egyptian shore crabs (*Carcinus meanas*) has been studied. Such studies involved the determination of: pH-value, moisture, total nitrogen, protein nitrogen, total volatile basic nitrogen (TVB-V), diethyl ether extract, acid value, thiobarbituric acid value (TBA) and total bacterial count (TC). It was found that the peeled raw and cooked crabs can be kept at -10 C for 3 and 5 months, respectively without any spoilage. Unpeeled raw crabs can be preserved at -10 C for 4 months without any deterioration. Dipping of unpeeled raw crabs in 20 ppm chlorotetracycline (CTC) for 20 minutes raised the keeping period up to 5 months. In general, prolonged frozen storage at -10 C markedly affected the chemical and technological characteristics of crab meat. AA

- 733 PARKIN (KL) and BROWN (WD). Modified atmosphere storage of dungeness crab (*Cancer magister*). *J. Food Sci.* 48(2); 1983; 370-74

- 734 HIMELBLOOM (BH), RUTLEDGE (JE) and BIEDE (SL). Colour changes in blue crabs (*Callinectes sapidus*) during cooking. *J. Food Sci.* 48(2); 1983; 652-3

CLAM

- 735 BURNETTE (JA), FLICK (GJ), MILES (JR), ORY (RL), St. ANGELO (AJ) and DUPUY (HP). Characterization and utilization of ocean quahog (*Arctica islandica*) clam juice as a liquid and dehydrated flavouring agents. *J. Food Sci.* 48(2); 1983; 353-9

SHRIMP

- 736 MA (LY), DENG (JC), AHMED (EM) and ADAMS (JP). Canned shrimp texture as a function of its heat history. *J. Food Sci.* 48(2); 1983; 360-63

Texture changes of canned shrimp were determined by sensory and instrumental methods. A direct relationship was found between sensory perception of toughness and instrumental shear forces measurements in canned shrimp packed in 2.6% brine in 307 x 113 cans, and processed at 124 C. Shrimp muscle toughened during the initial stages of heating and softened during the latter stages of processing. The softening of shrimp texture (shear values) was determined to follow apparent first order behaviour. Regression analyses were used to establish apparent reaction rate constants, an apparent activation energy (24 Kcal/mole), textural D values and textural Z values (30 C). AA

PROTEIN FOODS

FRUIT JUICES AND BEVERAGES

- 737 ANON. Reverse osmosis for juices. *Food Eng. Int.* 8(4); 1983; 44-5
- 738 DANIELS (DH), WARNER (CR), SELIM (S) and JOE (FL) Jr. Gas-liquid chromatographic determination of dehydroacetic acid in squash and wine. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 893-6
 A gas-liquid chromatographic procedure has been developed for the determination of the preservative, dehydroacetic acid (DHA) in frozen cut squash and white wine. The cleanup procedure uses the acidic character of DHA to enhance separation from interfering substances. Recoveries were 93-104% from squash fortified at 30, 65, and 130 ppm and 96-99% from wine fortified at 50, 100, and 200 ppm. AA
- 739 LI (BW) and SCHUHMANN (PJ). Sugar analysis of fruit juices: Content and method. *J. Food Sci.* 48(2); 1983; 633-5, 653
 The sugar contents of 186 samples of 11 different juices from a nationwide sampling were determined by the use of a total sugar analyzer (TSA), a gas-liquid chromatograph (GLC) or both. Values for total sugar ranged from <3% in most tomato juices to <15% in some lemonades on a ready-to-serve basis. Agreement between the two methods was satisfactory. AA
- 740 SONTAG TRANT (A) and PANGBORN (RM). Discrimination, intensity, and hedonic responses to colour, aroma, viscosity, and sweetness of beverages. *Food Sci. + Technol.* 16(3); 1983; 147-52
 Discrimination, perceived intensity, and degree of liking were measured among 29 subjects, in response to colour in orange juice, aroma of apple juice, viscosity of apricot nectar, and sweetness of lemonade. The three psychophysical measurements resulted in independent functions. Whereas as perceived, intensity was directly related to stimulus concentration for all subjects, diverse responses were observed for hedonic judgements, and neither was related to ability to discriminate between small concentration differences. Judgements of intensity did not vary notably over the experimental period of 6 weeks, but hedonic responses did fluctuate widely, particularly for sweetness. The independence of the three response functions within all four sensory modalities emphasizes the invalidity of a common psychophysical function, and of extrapolation from one method to the other. KMD

GRAPE JUICE

- 741 SISTRUNK (WA) and GASCOIGNE (HL). Stability of colour in 'Concord' grape juice and expression of colour. *J. Food Sci.* 48(2); 1983; 430-33, 440
 The experiment was designed to determine the influence of chemical additives, ascorbic acid and storage time on 'Concord' grape juice colour. Adding low concentrations of CaSO_4 and SnCl_2 increased retention of colour as measured by Colour Difference Meter (CDM) L, a and b values and by colour expression a/L, aL and ab/L. Rapid colour changes occurred during storage after 3 months except in juice with added CaSO_4 and SnCl_2 . Ascorbic acid fortification accelerated colour loss in some of the treatments. The highest correlations between sensory quality and instrumental colour were those between sensory ratings for browning, flavour and hue and CDM L values, anthocyanins and absorbancies at 535/430 nm. AA

CITRUS JUICE

- 742 BRADDOCK (RJ). Utilization of citrus juice vesicle and peel fiber. *Food Technol.* 37(12); 1983; 85-7

The uses of juice vesicle for producing a drum-dried product and also a frozen product have been described. The composition of dry peel and a variety of uses have also been given. JVS

- 743 SHAW (PE) and WILSON (CW) III. Debittering citrus juices with β -cyclodextrin polymer. *J. Food Sci.* 48(2); 1983; 646-7

A β -cyclodextrin polymer was used to remove the bitter substances limonin and naringin from aqueous solution and from filtered orange and grape fruit juices using batch and continuous flow column treatments. Other components such as naringenin 7 β -rutinoside, coumarins and flavonoids were removed, but the total soluble solids (Brix), total acidity and ascorbic acid content of the juice were unchanged. The polymer could be regenerated by extraction with an organic solvent. AA

- 744 CRANDALL (PG), MATTHEWS (RF) and BAKER (RA). Citrus beverage clouding agents: review and status. *Food Technol.* 37(12); 1983; 106-9

Citrus juice cloud is used in fruit drink industry and can be prepared from citrus wastes. It is a heterogenous mixture of particulates containing cell wall fragments, oil drops, chromatophores and some hesperidin crystals. This overview deals with the properties of the cloud, clarification for the removal of cloud from citrus juice, stabilisation of cloud beverage, clouding agents, and sources of natural beverage clouding agents. A table providing the chemical composition of orange juice cloud could be useful. JVS

- 745 JOHNSON (JD) and VORA (JD). Natural citrus essences. *Food Technol.* 37(12); 1983; 92-3, 97

The off flavour components of citrus juices are separated into an aqueous phase and an oil phase. The part remaining in the oil phase is the essence oil; while the remaining oil is called aroma. The review covers; the 2 types of fractionating skills employed for essence production, chemical composition of orange essence, orange aroma and orange essence oil. JVS

- 746 MEHTA (U) and BAJAJ (S). Effects of storage and methods of preservation on the physico-chemical characteristics of citrus juices. *Indian Food Pack-er.* 37(4); 1983; 42-51

Juices of three varieties were preserved with pasteurization, potassium metabisulphite (700 ppm of sulphur dioxide and sodium benzoate (0.05%). These juices were stored in glass bottles at room temperature for eight months and tested at monthly interval for nutritional quality. Colour retention during storage was better in samples preserved with potassium metabisulphite in comparison with the other two methods of preservation. A slight increase (0.74 to 1.77%) in total soluble solids was observed. There was a notable loss (23.27 to 60.52%) in ascorbic acid and loss of acidity ranged from 13.83 to 51.70%. An increase in the range of 5.89 and 30.15% in total sugars and 47.36 to 104.3% in reducing sugars was observed during storage period. Retention of carotenoids ranged from 3.05 to 21.05% and that of flavonoids from 17 to 94%. BSN

ORANGE JUICE

- 747 PARK (GL), BYERS (JL), PRITZ (CM), NELSON (DB), NAVARRO (JL), SMOLENSKY (DC) and VANDERCOOK (CE). Characteristics of California navel orange juice and pulpwash. *J. Food Sci.* 48(2); 1983; 627-32, 651

California navel orange juice, two-stage pulpwash and concentrated orange juice obtained from a commercial processing plant during the 1979-80 processing season were analyzed by chemical, physical and microbiological methods. Statistically significant differences ($P < 0.01$) were found between single-strength orange juice and pulpwash in the concentration of nitrate, sulphate, phenolics, carbohydrates, protein, pectin, UV/VIS absorption characteristics, minerals and carotenes. Seasonal variations were found in carbohydrates, organic acids, minerals, microbiological data, UV/VIS absorption characteristics, carotenoids, protein and phenolics. This report outlines methods of analysis, summarizes analytical results and discusses application of these findings to the detection of pulp-wash adulteration of orange juice. AA

- 748 TRIFIRO (A), GHERARDI (S), BIGLIARDI (D) and BAZZARINI (R). Limonin in orange juices from the Italian variety Sanguinello. *Ind. Conserve.* 58(1); 1983; 19-22 (Italian)

The limonin content was determined in industrially produced orange juices from Italian Sanguinello cultivar. The variations in limonin content of the juices due to extraction technique (fixed or revolving reamers, FMC In-line extractors, rotary extractors), screening and centrifuging treatments and juice recovery from peel and rag residues by pressing were studied. Limonin was determined by Rouseff and Fisher's HPLC method modified with regard to sample preparation. AA

- 749 VANDERCOOK (CE), NAVARRO (JL), SMOLENSKY (DC), NELSON (DB) and PARK (GL). Statistical evaluation of data for detecting adulteration of California navel orange juice. *J. Food Sci.* 48(2); 1983; 636-40, 655

Compositional data from California early-, mid-, and late-season navel orange juice, concentrate and two-stage pulpwash were analyzed by various statistical techniques (ratios, regression, chi-square, linear combination, and discriminant analysis) for detecting adulteration. These techniques were evaluated according to applicability for detecting three types of adulteration: (1) addition of sugar and/or citric acid, (2) addition of excess or unauthorized pulpwash, and (3) addition of other constituents intended to mask the dilution. Most parameters were significantly affected by time of harvest following commercial maturity. Two-stage pulpwash showed small but significant differences from corresponding single strength juice. Product differences were of about the same magnitude as the differences due to harvest date. AA

APPLE JUICE

- 750 MANSSIEV. Technical and technological aspects of apple-juice manufacture. *Lebensmittel-industrie.* 30(7); 1983; 301-2 (German)

Experiments, conducted in Bulgaria, on the technological lay-out for manufacture of clear apple juice have been reported. Special attention is given to the pressing out of juice from the apple mash. Some indications are given relating to Bulgarian apple-juice plants. KMD

- 751 SHEU (MJ) and WILEY (RC). Preconcentration of apple juice by reverse osmosis. *J. Food Sci.* 48(2); 1983; 422-9

Single strength apple juices (10°Brix) were processed by reverse osmosis to 20-25°Brix, primarily at 20 C. A pilot scale plate and frame UF-RO system equipped with cellulose acetate (CA) membranes, CA-865 and/or CA-990, or high resistance (HR) membranes, HR-95 and/or HR-98, was operated at pressures of 35-45 bar. At 45 bar, the larger pore-sized CA-865 possessed the highest processing capacity of 26.9 L/m²/hour (from 10°Brix to 20°Brix) and concentration limits of 35 °Brix, but had low recovery of solutes and flavour volatiles. The HR-95 and HR-98 had similar processing capacities of 15-16 L/m²/hour and concentration limits of 20-25°Brix at 45 bar. The recoveries of 97% solutes and 87% apple flavour volatiles were obtained using either the HR-95 or the HR-98. AA

COFFEE

- 752 ANDRADE-AISPURO (J) and CROUZET (J). Recovery of the aroma of coffee during roasting. III. Study of the volatile compounds emitted during fluidized-bed roasting of coffee, with recycling of gases. *Cafe, Cacao, The.* 27(3); 1983; 209-18 (French)

Based on the results obtained earlier with a roasting simulator, an installation was designed for the fluidized-bed roasting of coffee. The optimum operational conditions for recovery of aroma compounds from the recycled gases were determined. Fractions containing the aroma compounds were obtained by condensation and absorption in water. Some of the characteristic compounds identified in these fractions are: pyrazines, pyridines, pyrroles, furan derivatives, phenols, acids, cyclotene, and maltol. The basic compounds, cyclotene and maltol, and phenols appear to play a particularly important role. The phenols, however, produce a disagreeable, prickly sensation, and their content should be strictly limited, by controlling the rate of recycling of the water used for absorption. KMD

- 753 SMOLA (U) and SONTAG (G). Polarographic determination of trigonelline in coffee. *Z. Lebensmittel-Unters. Forsch.* 177(2); 1983; 114-6 (German)

Two polarographic methods for quantitative determination of trigonelline in green coffee and in roasted coffee have been investigated. After removing interfering substances on a polyamide column trigonelline can be determined by differential pulse polarography. For determination by phase selective alternating current polarography, still remaining interfering substances have to be removed by liquid-liquid extraction on an Extrelut-column. The amount of trigonelline present in green coffee is 0.8 to 1%, in roasted coffee 0.5 to 0.7%. AA

COCOA

- 754 KIM (H) and KEENEY (PG). Method of analyses for (-)-epicatechin in cocoa beans by high performance liquid chromatography. *J. Food Sci.* 48(2); 1983; 548-51

- 755 JALON (M), SANTOS-BUELGA (C), RIVAS-GONZALO (JC) and MARINE-FONT (A). Tyramine in cocoa and derivatives. *J. Food Sci.* 48(2); 1983; 545-7

- 756 SCHAFER (H). Analysis of nonstarch polysaccharides in cocoa powder by a new micromethod. *J. Agric. Food Chem.* 31(6); 1983; 1375-6

Commercial cocoa powder was analyzed for nonstarch polysaccharides by means of a new micromethod. The defatted sample was treated with α -amylase from porcine pancreas in order to degrade native starch. The ungraded residue was hydrolyzed in the presence of a cation-exchange resin. Sugars deriving from nonstarch polysaccharides were isolated and subjected to anion-exchange chromatography. Only the neutral fraction was collected. After derivatization to aldonitrile acetates the component sugars were identified and determined semiquantitatively by gas chromatography. The main components of the nonstarch polysaccharides in cocoa powder were constituted of components from glucose, galactose, and arabinose. AA

- 757 LEHMANN (G). Cocoa beverages - thirst-quenching and nutritive. *Gordian*. 83(3); 1983; 45-6 (German)

The chemical composition of a typical cocoa beverage has been reported. As the production of fruit and vegetable beverages is insufficient to meet the demand, the author recommends the sale of cocoa beverages which are very nutritive, and have a very low caffeine content (less than 0.03% in the powder). The theobromine present in cocoa can act as a diuretic, and the quantity present is insignificant, from the physiological standpoint. KMD

WINE

- 758 LIGHT (FR). Impact of foreign wine on cereal product ingredients. *Cereal Food World*. 28(12); 1984; 721-2

- 759 BERNAL (JL), DEL NOZAL (MJ), ALLER (AJ) and DEBAN (L). Chloride determination in wines with a chloride-selective electrode. *Rev. Agroquím Tecnol. Aliment.* 23(1); 1983; 137-42 (Spanish)

A method for chloride determination in wines using a chloride-selective electrode is proposed. Based on the results of a previous study of the ethanol interference, the use of the standard additions procedure is recommended. The results provided by this method are successfully compared with some others of common use for such a determination. AA

- 760 RIVAS-GONZALO (JC), SANTOS-HERNANDEZ (JF) and MARINE-FONT (A). Study of the evolution of tyramine content during the vinification process. *J. Food Sci.* 48(2); 1983; 417-18, 429

- 761 BARANOWSKI (ES) and NAGEL (CW). Kinetics of malvidin-3-glucoside condensation in wine model systems. *J. Food Sci.* 48(2); 1983; 419-21, 429

Wine model systems containing equimolar quantities of malvidin-3-glucoside and d-catechin, with and without acetaldehyde, were stored anaerobically at 22, 32, 42, and 52 C. Malvidin-3-glucoside and d-catechin disappearance and polymer appearance were monitored by HPLC and colorimetric methods. Reaction rates and activation energies were calculated. The malvidin-3-glucoside and d-catechin condensation reactions showed pseudo first order kinetics both with and without the presence of acetaldehyde. However, activation energies were not significantly different. AA

BEER

- 762 SAXBY (MJ), SMITH (PR), BLAKE (CJ) and CONVENY (LV). The degradation of folic acid in a model food system and in beer. *Food Chem.* 12(2); 1983; 115-26

In the presence of light, sulphur dioxide markedly accelerates the rate of degradation of folic acid, whereas in the dark it exhibits a protective effect. In beer, the presence of sulphur dioxide has no effect on the degradation of folic acid, whether in the light or in the dark. Products of degradation are given. KAR

OILS AND FATS

- 763 LAWRENCE (BM). Progress in essential oils. *Perfum. Flavor.* 8(3); 1983; 65-72, 74

Discusses: anise oil; bergamot oil; cabrenva balsam oil; celery seed oil; chervil oil; and tejpat (*Cinnamomum fatale*) oil. BSN

- 764 DUVERNEUIL (G) and VALENTE (M). Proposed robust and original piece of laboratory apparatus for measuring essential oil content by distillation. *Fruits.* 38(3); 1983; 201-7 (French)

The classical Clevenger apparatus used in the laboratory for estimation of essential oil content by distillation is too fragile and costly, and requires highly trained operators. Hence, a more robust instrument for estimation of essential oils has been designed, which can be used in the manufacturing premises by less skilled personnel, to measure the essential oil content of the raw materials to be processed. The new apparatus can be used only to determine only those essential oils which are less dense than water, and are immiscible in water - e.g. essences of citrus fruits, origanum, etc.,. The performance of the new apparatus has been described. KMD

- 765 BRUCE (P), McCLASKY and BROWN (AJ). Edible oil analysis using colorimetry. *Food Flavour. Ingrid. Process. Packag.* 5(4); 1983; 57

Discusses the design details, mode of operation and advantages of colorimeter developed for analysis of edible oil. BSN

- 766 FRANKEL (EN), SMITH (LM), HAMBLIN (CL), CREVELING (RK) and CLIFFORD (AJ). Occurrence of cyclic fatty acid monomers in frying oils used for fast foods. *J. Am. Oil Chem. Soc.* 61(1); 1984; 87-90

Cyclic fatty acid monomers were analyzed by gas chromatography in commercial frying oils obtained in this country and in the Middle East. Samples were obtained from food outlets in California and Illinois after varying periods of usage. The samples from Egypt and Israel were collected from street vendors frying vegetable patties (known as "fallafel") in open-air stands. The United States samples ranged from 0.1 to 0.5% cyclic monomers, and from 1 to 8% polar + noneluted thermal oxidation materials. The Middle Eastern samples showed significantly more heat abuse, with values for cyclic monomers from 0.2 to 0.7% and polar materials ranging from 2 to 22%. AA

- 767 DZIEDZIC (SZ) and HUDSON (BJF). Polyhydroxy chalcones and flavonones as antioxidants for edible oils. *Food Chem.* 12(3); 1983; 205-12

Eleven polyhydroxy chalcones and flavonones derived by isomerization were synthesized and tried on lard. Two of them 3', 3, 4-trihydroxy-

and 2', 4',; 2,3-tetrahydroxy chalcone are tried for the first time. 3,4-dihydroxy chalcones such as butein and akamin are particularly effective antioxidants in the range of concentrations 0.025-0.1% as judged by induction period measurements. Chalcones are more effective than the corresponding flavonones. KAR

- 768 WEISS (A) and MIETH (G). Lipolytic rate of potential fat - substitutes on the basis of a caloric fat like materials. *Nahrung*. 27(3); 1983; K13-14

- 769 DAUGHERTY (CE) and LENTO (HG). Chloroform-methanol extraction method for determination of fat in foods. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 927-32

A chloroform-methanol extraction method (complete extraction of fat in 3 minutes) for determining fat in processed and prepared foods has been studied collaboratively. Fourteen collaborators reported single replicate fat results on 7 samples representative of various food types and 2 spiked samples by the proposed method. Each sample was accompanied by a blind duplicate. For statistical purposes, the blind duplicates were treated as paired observations, and there were 2 laboratory outliers. There was a 97.9% agreement among the results from the remaining 12 collaborators and the Associate Referee for the unfortified samples. Recoveries of 93.8 and 98.3% were obtained on fortified samples, based on results obtained from 11 collaborators. The statistical analysis of the results indicate (ranges for standard deviations were $S_r = 0.083-0.528$, $S_b = 0.101-0.379$, $S_d = 0.130-0.631$, for fat values ranging from 1.58 to 26.91%) that this method is adequate for quantitating the fat content in a wide variety of processed foods for nutritional labelling. AA

- 770 REUTER (W), KOHLER (H), VOIGT (H), HERRMANN (W), KULINSKI (B) and LINDHOFER (H-G). Long-term effects of polyunsaturated fatty acids (PUFA) on lipid metabolism in arteriosclerosis. *Ernährungsforschung*. 28(2); 1983; 49-52 (German)

Feeding a diet enriched with polyunsaturated fatty acids (40 ml sunflower oil or linseed oil daily) for one year to patients suffering from peripheral arteriosclerosis led to specific changes in the lipid and lipoprotein metabolism in the serum. Total and LDL cholesterol remained unaffected by PUFA, as did the ratio of LDL/HDL cholesterol; but the triglyceride and apoprotein B levels fell. The ratio Apo B/Apo A became more normal. PUFA also produced an increase in linoleic and linolenic acids, and a decrease in palmitic and oleic acids. This "anti-atherogenic" action of PUFA on the fatty acid spectrums, - namely, a stimulation of the prostacyclin defence potential - may be regarded as being "vasoprotective". KMD

- 771 ADLOF (RO) and EMKEN (EA). Synthesis and purification of polyunsaturated triglycerides. *J. Am. Oil Chem. Soc.* 61(1); 1984; 83-5

GROUNDNUT OIL

- 772 GOPALAKRISHNA (AG) and PRABHAKAR (JV). Effect of water activity on autooxidation of raw peanut oil. *J. Am. Oil Chem. Soc.* 60(5); 1983; 968-70

The effect of water activity (a_w) on rate of autooxidation of raw peanut oil at 37 C was studied. Up to 3 weeks of storage, no marked effect of a_w on the rate of peroxide formation was noticeable. However, with prolonged storage, the rate of peroxide formation decreased rapidly at a_w of 0.67 and

higher as compared to a_w of 0.50 and lower. At the end of 9 weeks storage, the peroxide value at $a_w = 0.02-0.50$ was in the range of 31-35, while it was only ca. 10 at 0.79 and 0.92 a_w . There was no noticeable influence of a_w on the rate of free fatty acid formation. The oil stored for 7 weeks at 0.02 and 0.11 a_w had fresh flavour, although the peroxide values were high; whereas the oils at 0.79 and 0.92 a_w were stale, although the peroxide values were less than 10. The anisidine value at 0.2 a_w (348) was higher than at 0.92 a_w (62). The carbonyl values at 0.02 and 0.11 a_w were also higher (1090, 1021) than at 0.79 and 0.92 a_w (573, 780). The results indicate that the protective effect on the oil against peroxide formation at high a_w may be due to certain components present in raw peanut oil. AA

MAIZE OIL

- 773 COMS (R) and VAN PEE (W). Determination of trace metals content in corn oil by atomic absorption spectroscopy. *J. Am. Oil Chem. Soc.* 60(5); 1983; 957-960

Atomic absorption spectrophotometry is used for the determination of Cu, Fe, K, Na, Ni and Zn in industrial refined corn oil. The results of five different analytical techniques are compared. Fair agreement is obtained between the char-ashing method and the dilution procedure. Char ashing is a sensitive and useful technique, if handled correctly. Dilution, coupled to carbon-rod atomization, is a reliable method. To eliminate errors, due to sample loss, a proper injection technique is required. Extraction methods suffer from incomplete recoveries, owing to deficient break up of the organo-metallic compounds in oil. AA

SOYABEAN OIL

- 774 AL-KAHTANI (HAM), HANNA (MA) and HANDEL (AP). Effect of water quality on degumming and stability of soyabean oil. *J. Am. Oil Chem. Soc.* 61(1); 1984; 94-7

Solvent-extracted crude soyabean oil was degummed with deionized distilled water containing various amounts of $\text{CaCO}_3\text{-MgCO}_3$, FeCl_2 , and NaCl. The total phosphorus content remaining in the degummed oil was determined and the peroxide value of the degummed oil held at 98-101 C was measured daily for 10 days. The results were compared statistically with those from oil degummed with deionized distilled water as a control. It was found that 250 mg/L of $\text{CaCO}_3\text{-MgCO}_3$ significantly reduced the efficiency of the degumming process. FeCl_2 at concentrations of 150 and 250 $\mu\text{g/L}$ and NaCl at 300 mg/L resulted in the removal of more phosphorus than the control at the 5% level of significance. Generally, the stability of the degummed oils decreased as the salt concentrations increased. The rate of oxidation was greater for oils degummed in the presence of FeCl_2 than of NaCl and $\text{CaCO}_3\text{-MgCO}_3$ under the same conditions. AA

- 775 WILCOX (JR), CAVINS (JF) and NIELSEN (NC). Genetic alteration of soyabean oil composition by a chemical mutagen. *J. Am. Oil Chem. Soc.* 61(1); 1984; 97-100

JOJOBA

- 776 GALUN (AB), SHAUBI (E), MARKUS (A), GRINBERG (S) and ZABICKY (J). Photo-sensitized *cis-trans* isomerization of joboba wax. *J. Am. Oil Chem. Soc.* 61(1); 1984; 102-3

GHEE

- 777 LAMBELET (P) and GANGULI (NC). Detection of pig and buffalo body fat in cow and buffalo ghees by differential scanning calorimetry. *J. Am. Oil Chem. Soc.* 60(5); 1983; 1005-8
- Adding small amounts of pig or buffalo body fat to cow or buffalo ghee results in the appearance of an extra peak located at high temperature in the melting and crystallization curves as determined by the differential scanning calorimetry (DSC) technique. Ghee adulterations with these animal fats at levels down to 5% are clearly seen in the crystallization diagrams. Quantitative measurements can be obtained by this method in the case of adulterations with buffalo body fat. On the other hand, this method does not detect vegetable oils such as coconut oil, and gives similar results for cottonseed-fed buffalo ghee and ghee adulterated with animal body fats. AA

SPICES AND CONDIMENTS

- 778 BRIGGS (D). Seasoning and spices - their value to the food industry. *Food Flavour Ingred. Process. Packag.* 5(1); 1983; 18-9
- 779 SANDELIN (K). Spice flavours: History, production and application. *Food Flavour. Ingred. Process. Packag.* 5(1); 1983; 12-3, 17

PEPPER

- 780 MANGALAKUMARI (CK), SREEDHARAN (VP) and MATHEW (AG). Studies on blackening of pepper (*Piper nigrum* Linn.) during dehydration. *J. Food Sci.* 48(2); 1983; 604-6
- Histochemical studies carried out in fresh green pepper berries at different stages of maturity showed that phenolic compounds distributed throughout the berries at a very young stage were confined to the epicarp and mesocarp alone at full maturity. The blackening that occurs in pepper on drying or on injury also showed a similar distribution pattern. Flavanols were not found in the young stage but appeared in the innermost cells of mesocarp covering endocarp after fertilization. Spores of *Glomerella cingulata*, present even in healthy pepper berries, were found to be the source of phenolase enzyme taking part in the blackening. Phenols in pepper were enzymatically oxidized and gave rise to black colour when the cells were disturbed by dehydration or maceration. AA
- 781 VARSANYI (I), KALMER-BLAZOVICH (M) and FEHER (I). Changes in the quality of ground black pepper packaged in different materials during storage. *Acta Aliment.* 12(1); 1983; 21-33

Changes in the quality of ground black pepper packaged in different materials was studied as a function of storage time at room temperature and of packaging material. By mathematical and statistical evaluation of the results, it was established that changes in quality were reflected by changes in the volatile oil content. As regards the packaging materials, the quality of ground black pepper was maintained for the longest period in the glass jar, PVDC-coated paper being the second best and pouches made of the combined foil the poorest. AA

- 782 PAGINGTON (JS). A review of oleoresin black pepper and its extraction solvents. *Perfum. Flavor.* 8(4); 1983; 29-32, 34, 36

Discusses the advantages, comparative performance, consumer specification requirements of final products and legislative aspects involved in the use of acetone, methylene chloride, ethylene dichloride, carbon dioxide, and ethyl alcohol as solvents in the extraction of oleoresins from black pepper. BSN

DILL

- 783 JAMES (C) and BUESCHER (R). Preference for commercially processed dill pickles in relation to sodium chloride, acid and texture. *J. Food Sci.* 48(2); 1983; 641, 643

SENSORY EVALUATION

- 784 URBANYI (Gy). Investigation into the interaction of different properties in the course of sensory evaluation tests. The effect of consistency upon taste. *Acta Aliment.* 12(2); 1983; 109-7

Experiments were conducted with quick-frozen raspberries, quick-frozen string beans (4 varieties), fresh potatoes, and fresh cauliflower, to determine the interaction of taste and consistency, during sensory evaluation by a panel of 10 members. Scores were evaluated by Kramer's method, and correlation coefficients were calculated. Generally speaking, the consistency of the samples influenced the evaluation of taste, particularly in the case of foods for which consistency is an important quality parameter (e.g. raspberries). This tendency was not observed in foods that had been prepared in various ways for general consumption, nor was it observed when the consistency factor was eliminated by pulping. KMD

- 785 COSTELL (E). The taste panel as an analytical instrument. *Rev. Agroquim. Tecnol. Aliment.* 23(1); 1983; 1-10 (Spanish)

A brief discussion of the procedure for the establishment of a taste panel of analytical judges, covering preselection, selection, training, and testing. KMD

- 786 PELEG (M). Stress and strain activated fracture elements. *J. Texture Stud.* 14(2); 1983; 87-98

The characteristics of fracture elements in which the activation criterion is either a critical stress and/or strain are described. Their possible effects on the properties of phenomenological rheological models are demonstrated in the case of simplified models subjected to hypothetical

deformation, stress relaxation and creep tests. It is also shown that introduction of the double criterion to models could produce rheological response patterns, especially in creep, that are more consistent with those of real materials. AA

- 787 BISTANY (KL) and KOKINI (JL). Comparison of steady shear rheological properties and small amplitude dynamic viscoelastic properties of fluid food materials. *J. Texture Stud.* 14(2); 1983; 113-24

FOOD STORAGE

- 788 LONGSTAFF (BC) and POCKWALL (J). A new technique for sampling experimental grain bulks. *J. Stored Prod. Res.* 19(2); 1983; 69-71

A sampling technique is described which minimises the habitat disturbance that occurs during frequent sampling of a small grain bulk. The technique permits the replacement of sampled grain and insects at the original site of sampling, thereby preventing grain from collapsing into the space left by sample extraction. AA

- 789 LONGSTAFF (RA) and FINNIGAN (JJ). A wind tunnel model study of forced convective heat transfer from a horizontal grain storage shed. *J. Stored Prod. Res.* 19(2); 1983; 81-7

Dry sublimation of naphthalene was used to stimulate the forced convective heat transfer from a model grain storage shed in a wind tunnel. The mass transfer of naphthalene vapour simulated heat transfer from a constant temperature boundary. Expressing the heat transfer in terms of the nondimensional Nusselt number Nu and the wind speed in terms of the Reynolds number Re , the relationship $Nu = 0.227Re^{0.633}$ was derived. The change in heat transfer for different orientations of the shed to the wind direction was not statistically significant. AA

- 790 VARSANYI (I) and SOMOGYI (L). Determination of the shelf life of food products. *Acta Aliment.* 12 (2); 1983; 73-100

The mechanism and dynamics of the quality changes taking place in food products during storage depend not only on the hygienic conditions, but also on the storage temperature and the method of packaging. The aim of the present study was to elaborate an objective method of evaluating the optimum conditions for quality maintenance. A continuous deterioration model was set up in order to solve the problem and it was found that the quality changes of the studied products can be described by functions approximating to linear, quadratic and hyperbolic curves. The applicability of the method is illustrated for one product each from the poultry, frozen foods and meat industries. AA

INFESTATION CONTROL AND PESTICIDES

- 791 ZDARKOVA (E), VERNER (PH) and NOVOSAD (J). Dispersion and distribution of mites and beetles in stored grain. *J. Stored Prod. Res.* 19(2); 1983; 73-80
- 792 BENZING (L). Use of sexual attractants in the fight against cocoa moths. *Gordian.* 83(1-2); 1983; 20-21 (German)

- 793 PEREIRA (J). The effectiveness of six vegetable oils as protectants of cowpeas and bambara groundnuts against infestation by *Callosobruchus maculatus* (F.) (Coleoptera:Bruchidae). *J. Stored Prod. Res.* 19(2); 1983; 57-62
Traditionally extracted neem kernel oil, karite oil, groundnut oil, palm kernel oil, palm oil and industrially extracted groundnut oil were assessed as protectants of cowpeas and bambara groundnuts against, *Callosobruchus maculatus* (F.). On cowpea, only neem kernel oil reduced oviposition at a treatment of 8 ml oil/kg seed. On bambara groundnut, neem kernel oil, palm oil and groundnut oil (industrially extracted) reduced oviposition at 3 ml oil/kg seed, while karite oil was effective at 5 ml oil/kg seed. With oil treatment, the degree of ovicidal activity was higher on bambara groundnuts than on cowpeas. Only neem oil also showed larvicidal properties. Even after 90 days storage, a major part of the toxic activity was retained by the cowpea testa. Neem oil at 8 ml oil/kg cowpea seed gave good protection up to 3 months, while 5 ml oil/kg bambara groundnut protected up to 6 months. AA
- 794 KHAN (MWY), AHMAD (F), AHMAD (I) and OSMAN (SM). Nonedible seed oils as insect repellent. *J. Am. Oil Chem. Soc.* 60(5); 1983; 945-50
Petroleum ether extracts of seeds at 10-1% concentration were tested for insecticidal activity against stored grain insects, *Tribolium castaneum*. Herbst, in the laboratory. About 50 oils were tested, of which ten showed repellent antifeedant property upto 1% concentration. AA
- 795 KRISHNAMURTHY (TS), MUTHU (M), MAJUMDER (SK) and MURALIDHARAN (N). Suitability of unitized container cans for pressure packing low boiling fumigants and their formulations. *Pesticides*. 17(6); 1983; 24-9
Various parameters for testing the empty and filled cans and data on their performance are presented. The vapour pressure characteristics of methyl bromide and its formulations with ethylene-di-bromide inside the filled cans have been reported. E50 tin can containers with a plate thickness of 0.30 mm for the body and 0.45 mm for the dished/concave ends were found most suitable for pressure packing MB and its formulations with liquid fumigants like EDB, Ethylformate, methyl formate and acrylonitrile. BSN
- 796 SUNDARAJAN (R) and CHAWLA (RP). Simple, sensitive technique for detection and separation of halogenated synthetic pyrethroids by thin layer chromatography. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 1009-12
- 797 BOLYGO (E) and ZAKAR (F). Gas-liquid chromatographic screening method for six synthetic pyrethroid insecticides. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 1013-7
- 798 NOACK (S), REICHMUTH (C) and WOHLGEMUTH (R). Relationship of PH_3 residues after-fumigation to concentration, time of exposure, and length of storage. *Z. Lebensmittel-Unters Forsch.* 177(2); 1983; 87-93 (German)
The rate of phosphine decomposition depends on fumigation and storage conditions. It is the more rapid, the shorter the duration of fumigation, the lower and the dose and the higher the storage temperature. This indicates the occurrence or diffusion and sorption phenomena and a nonhomogeneous distribution of phosphine in the fumigated material. Thus one residue determination cannot provide a conclusion about decomposition behaviour. AA

- 799 De VOS (RH), Van DOKKUM (W), OLTROF (PDA), QUIRIJNS (JK), MUYS (T) and Van Der POLL (JM). Pesticides and other chemical residues in Dutch total diet samples (June 1976-July 1978). *Food Chem. Toxicol.* 22(1); 1984; 11-21
- 800 SRINATH (D) and GUPTA (TC). Appraisal of demand, availability and usage of pesticides. *Pesticides*. 16(9); 1983; 3-5
The demand pattern of pesticides (1972-73 to 1981-82), availability and trend of applications have been presented and discussed. BSN

BIOCHEMISTRY AND NUTRITION

- 801 MOTOKI (M) and NIO (N). Crosslinking between different food proteins by transglutaminase. *J. Food Sci.* 48(2); 1983; 561-6
- 802 SARWAR (G), CHRISTENSEN (DA), FINLAYSON (AJ), FRIEDMAN (M), HACKLER (LR), MACKENZIE (SL), PELLETT (PL) and TKACHUK (R). Inter- and intra- laboratory variation in amino acid analysis of food proteins. *J. Food Sci.* 48(2); 1983; 526-31
Amino acid composition of casein, egg white, beef, soy isolate, rapeseed concentrate, pea flour and wheat flour were studied by seven collaborating laboratories. Samples were hydrolyzed with 6N HCl, performic acid + 6N HCl, and (with one exception) 4.2N NaOH. Amino acids were then determined by ion-exchange chromatography using automatic analyzers. One laboratory, however, determined tryptophan by treatment with p-dimethylaminobenzaldehyde. The colorimetric determination of tryptophan was comparable to the tryptophan values determined by ion-exchange chromatography. Interlaboratory variation of tryptophan (coefficients of variation, CV, up to 24%), cystine and methionine (CV up to 17%), was greater than that of most other amino acids (CV up to 10%). Intralaboratory variation for all amino acids was less than 5%. AA
- 803 GALLARDO (JM), MONTEMAYOR (MI) and PEREZ-MARTIN (R). Quantitative determination of histidine and histamine by two-dimensional thin layer chromatography and densitometry. *Rev. Agroquím. Tecnol. Aliment.* 23(1); 1983; 132-6 (Spanish)
The TLC solvent system used (Haworth, C. and Heathcote, J.G., *J. Chromatogr.*, 41, 380-385, 1969) give a good separation of histidine and histamine in mixtures of amino acids. The quantitative determination by densitometry was reproducible. AA
- 804 DOYON (L) and SMYRL (TG). Interaction of thiamine with reducing sugars. *Food Chem.* 12(2); 1983; 127-33
- 805 CUG (JC), VIE (M) and CHEFTEL (JC). Tryptophan degradation during heat treatments: Part 2. Degradation of protein-bound tryptophan. *Food Chem.* 12(2); 1983; 73-88
The results obtained with diluted model systems suggest that only severe heat treatments in the presence of oxygen cause a significant degradation of protein bound tryptophan. Moderate heat treatments such as domestic and industrial cooking, or sterilization, could, however, decrease the nutritional availability of tryptophan if they induced the formation of protein cross-links and/or the isomerization of L- into D-tryptophan residues. KAR

- 806 VARO (P), LAINE (R) and KOIVISTOINEN (P). Effect of heat treatment on dietary fibre. *J. Assoc. Off. Anal. Chem.* 66(4); 1983; 933-8
- 807 WOGGON (H) and KLEIN (S). Methylation reactions of trace elements. *Nahrung.* 27(1); 1983; 21-9

TOXICOLOGY AND HYGIENE

- 808 SIEGEL (Th). List of literature references providing data on the fundamentals of evaluation of the risks caused by heavy metals in foods, cosmetics, and other objects of daily use. *Dtsch. Lebensmittel-Rundschau.* 79(2); 1983; 48-55 (German)

Various German documents containing legal provisions, standards, and guidelines relating to the presence (or permissibility) of heavy metals in foods and cosmetics have been listed. KMD

- 809 ANON. Chromosome damage from ethylene oxide. *Food Chem. Toxicol.* 22(1); 1984; 86-7

- 810 CADERNI (G), KRAMER (BL) and DOLARA (P). DNA damage to mammalian cells by the beef extract mutagen 2-amino-3-methylimidazo(4,5-f)quinoline. *Food Chem. Toxicol.* 21(5); 1983; 641-3

The beef-extract mutagen, 2-amino-3-methylimidazo(4,5-f)quinoline (IQ), was shown, by alkaline elution procedures, to induce DNA damage in radiation-induced mouse leukaemia cells. The effect, which was dose related, occurred in incubations containing S-9 mix derived from polychlorinated biphenyl-induced rat liver but not in the absence of this metabolic activation system. An increased alkaline elution of DNA was also observed following IQ addition to cultures of hepatocytes from 3,3',4,4'-tetrachloroazobenzene-induced rat liver, and the DNA damage was again dose related. IQ has thus been shown to be genotoxic to mammalian cells in the presence of an effective activation system. AA

- 811 KITCHEN (KT), EBRON (MT) and SVENDSGAARD (D). *In vitro* study of embryotoxic and dysmorphogenic effects of mercuric chloride and methylmercury chloride in rats. *Food Chem. Toxicol.* 22(1); 1984; 31-7

Outbreaks of mercury poisoning in Japan and Iraq have been attributed to contaminated fish and a methyl mercury coated grain respectively. JVS

- 812 LIJINSKY (W), REUBER (MD) and RIGGS (CW). Carcinogenesis by combinations of N-nitroso compounds in rats. *Food Chem. Toxicol.* 21(5); 1983; 601-5

- 813 SCHWARTZ (SJ), Von ELBE (JH), PARIZA (MW), GOLDSWORTHY (T) and PITOT (HC). Inability of red beet betalain pigments to initiate or promote hepatocarcinogenesis. *Food Chem. Toxicol.* 21(5); 1983; 531-5

Four groups of female Sprague-Dawley rats were treated with betacyanin pigment preparations to assess their ability to initiate hepato carcinogenesis. The animals were sacrificed after 6 months and 8 months. Liver sections were stained with cosin and haematoxylin and for GGT activity. The observations indicated that the test preparations employed in this study, namely, betacyanin solution (50 mg/kg); pure betanin (50 mg/kg), degraded betanin (50mg/kg) and a betacyanin diet (2000 ppm/kg) did not initiate or promote hepatocarcinogenesis. JVS

- 814 GAUNT (IF), WRIGHT (MG), COTTRELL (R) and GANGOLLI SD). Short-term toxicity of 2,6-dimethylhept-5-en-1-al in rats. *Food Chem. Toxicol.* 21(5); 1983; 543-49

Groups of 15 male and 15 female rats were fed for at least 90 days on diets that provided 2,6-dimethylhept-5-en-1-al (DMH) at average intakes of 0 (control), 9, 37 and 150 mg/kg body weight/day. Steps were taken to limit loss of DMH during diet mixing, storage and feeding. No effects attributable to treatment were encountered in body weight, food intake, water intake, haematology (at week 6 and 13) or the gross and microscopic pathological examinations. At the highest dose level there was a slight reduction in renal concentrating ability at week 6 in males and week 14 in females, together with a small increase in relative kidney weight and liver weight in females. The serum-glucose concentrations of both sexes on the highest dose were elevated compared with the controls. It was concluded that the intermediate dose, providing an intake of 37 mg/kg/day, was the no-untoward-effect level. AA

- 815 DENNIS (MJ), MASSEY (RC), McWEENY (DJ) and KNOWLES (ME). Analysis of polycyclic aromatic hydrocarbons in UK total diets. *Food Chem. Toxicol.* 21(5); 1983; 569-74

Analysis of UK total-diet samples for polycyclic aromatic hydrocarbons was carried out using a simplified sample clean-up and a high-performance liquid chromatography dual fluorescence detector system. The results indicate that cereals and oils/fats contribute the major part (approximately one third each) of the polycyclic aromatic hydrocarbons in these total diets. Fruit, sugars and vegetables provide much of the remainder (approximately one quarter) while meat, fish, milk and beverages make relatively minor contributions. These results are compared with others in the current literature on polycyclic aromatic hydrocarbons in foods. The levels in the UK diet seem to be at least as low as those found elsewhere. AA

- 816 LYNCH (SC), GRUENWEDEL (DW) and RUSSELL (GF). Mutagenic activity of nitrosated early Maillard product: DNA synthesis (DNA repair) induced in HeLa S3 carcinoma cells by nitrosated L(N-L-tryptophan)-1-deoxy-D-fructose. *Food Chem. Toxicol.* 21(5); 1983; 531-6

This study looks into the mutagenic potential of NO-TRP-FRU in a short-term test on cultured human cells. The established cell line HeLa S3 was used as the eukaryotic organism and observations were made primarily on the effects of TRY-FRU, NO-TRP-FRU and NaNO₂ on DNA synthesis under conditions that permit either normal replication or only repair. Two major routes are suggested by which NO-TRP-FRU could damage DNA. JVS

- 817 SLESINSKI (RS), HENGLER (PJ), GUZZIE (PJ) and WAGNER (KJ). Mutagenicity evaluation of glutaraldehyde in a battery of *in vitro* bacterial and mammalian test systems. *Food Chem. Toxicol.* 21(5); 1983; 621-9

Glutaraldehyde is used as a hardener for food-flavouring capsules and sausage casings. It has been evaluated for genotoxicity using for *in vitro* test systems; these systems are Salmonella/microsome assay, Chinese hamster ovary cell/hypoxanthine-guanine phosphoribosyltransferase gene mutation system, the sister chromatid exchange test with Chinese hamster ovary cells and measurements of DNA synthesis in primary rat-hepatocyte cultures. Within the range of biologically active concentrations, glutaraldehyde did not produce significant genotoxic effects with the assays and the conditions used for these studies. JVS

- 818 APPELGREN (LE) and ARORA (RG). Distribution of ^{14}C -labelled ochratoxin A in pregnant mice. *Food Chem. Toxicol.* 21(5); 1983; 563-8

Autoradiography was used to study the distribution of ^{14}C -labelled ochratoxin A for up to 4 hours after its iv administration to mice at various stages of pregnancy. The highest ^{14}C concentration was consistently found in the bile throughout the experimental period. The concentration of radioactivity in the tissues was found, in decreasing order, in the liver, kidney, blood, salivary glands, large vessels, brown fat, myocardium, uterus and lymphatic tissues. The toxin was shown to cross the placental barrier on day 9 of pregnancy, at which time it is most effective in producing foetal malformations. AA

- 819 GOLLA (S). Notes on *Clostridium botulinum*. *Ind. Conserve.* 58(2); 1983; 96-100 (Italian)

The main characteristics of *Clostridium botulinum* such as growth parameters (minimal water activity, pH and temperature for growth), thermal resistance of spores in different media and growth-inhibiting salt concentration, are examined. The physico-chemical characteristics of botulin toxin are also dealt with. The lower incidence of outbreaks of botulism caused by commercially canned foods compared with those due to homecanned foods is emphasized. The importance of nitrite, sorbate and salt as inhibitors of *C. botulinum* in semi-preserved meat products is pointed out. AA

- 820 BLOCHER (JC) and BUSTA (FF). Influence of potassium sorbate and reduced pH on the growth of vegetative cells of four strains of type A and B *Clostridium botulinum*. *J. Food Sci.* 48(2); 1983; 574-5, 580

I N D E X

- Acesulfame See Sweetener
- Acinetobacter calcoaceticus*•
 - bacteria
- Adansonia grandidieri* See baobab
- Adansonia suraregensis* See baobab
- Additives
 - guidline for approval 496
 - effect on wheat dough composition 518
- Aflatoxin
 - mushroom as medium, production 494
 - sprouted bean 554
- Aflatoxin B₁
 - rainbow trout
 - identification 723
 - mutagenicity 723
- Aflatoxin M₁
 - milk, determination, HPLC 668
 - rainbow trout
 - identification 723
 - mutagenicity 723
- Agaricus bisporus* See mushroom
- Agriculture, Indian: Scientific development 427
- Agro-food equipment industry, French 458
- Agro-food products, ionizing treatment process 428
- Alcaligenes* See bacteria
- Alkylresorcinol, wheat and wheat products, composition 537
- Allium tuberosum* See nira
- Almond, chemical changes during aflatoxin production 609
- Aluminium foil for packaging 447-8
- Aluminium kilned cast
 - Steel cans
 - food 450
 - pear juice 450
 - tomato concentrate 450
 - vegetables 450
- Amine
 - cheese, determination, HPLC 477
 - tuna, determination, HPLC 477
- 2-Amino-3-methylimidazo (4,5-f)quino-
line, beef extract; chromosomal damage 810
- Amino acid
 - analysis 802-3
 - canned food 437
 - cereals, composition 519
- Anise oil 763
- Antarctic fish fillet, stored: quality 280
- Anthocyanin degradation,
 - effect of furfural 471
 - effect of 5-hydroxymethyl furfural 471
- Antimicrobials
 - butylated hydroxyanisole 498
 - effect on fungus 499
 - butylated hydroxytoluene 498
 - dodecyl gallate 498
 - fructose 635
 - glucose 635
 - octyl gallate 498
 - propyl gallate 498
 - sorbic acid, effect on fungus 499
 - effect on yeast 500
- Antioxidants
 - food, extraction, TLC 502
 - orange, dried 620
 - plant, extraction, TLC 502
 - polyhydroxy chalcone in edible oils 707
- Apple
 - fiber composition 582
 - 'Golden Delicious': stored; quality, effect of CaCl₂ 625
 - 'Granny Smith': tensil property 627
 - 'McIntosh': stored; production of
 - acetaldehyde 624
 - ethanol 624
 - ethyl butyrate 624
 - hexanal 624
 - pectin composition 582
 - pesticide residues, determination 629, 634
 - polyphenol oxidase 608
 - quinomethionate residues, determination, HPLC 629
 - 'Red Delicious': shelf life, effect of CaCl₂ 626
 - 'Suntan': quality 628
- Apple juice
 - aroma determination 740
 - dewatering, osmosis 751
 - fiber composition 582
 - folic acid degradation 441
 - manufacture 750
 - pectin composition 582
- Apple sauce
 - fiber composition 582
 - pectin composition 582
- Apricot
 - O-dihydroxyphenol composition 608
 - polyphenol oxidase 608
 - serotonin composition, determination, spectrofluorimetry and TLC 612

GENERAL

- 821 RAO (HS). Choice of technology for endogenous development: role and experience of NRDC. *Invent. Intell.* 18(11); 1983; 449-56
Discusses: NRDC; vital link in the innovation chain; experiences of NRDC; and successes and failure in technology transfer and thoughts for reflection. BSN
- 822 SAWHNEY (PS). The American patent system: Salient features. *Invent. Intell.* 18(12); 1983; 493-502
Discusses: U.S. Patent office; what is a U.S. Patent; what can be patented; who can apply for a patent; patent search facilities; patent attorneys and agents; application for patent; specification; models, exhibits and specimens; examination of application; office action and applicant's response; drafting of claims by the examiner; appeals; interferences; issue of patent; assignments and licenses; infringements; design patents; plant patents; and foreign applicants. BSN

FOOD PROCESSING AND PACKAGING

PROCESSING

- 823 WYATT (CJ) and RONAN (K). Effects of processing on the sodium-potassium and calcium-phosphorus content in foods. *J. Agric. Food Chem.* 31(2); 1983; 415-20
The effects of processing on sodium:potassium (Na:K) and calcium:phosphorus (Ca:P) ratios in peanuts, wheat, tuna, canned green beans, whole kernel and cream-style corn, carrots, peaches, frozen green beans, corn, broccoli, cauliflower, and french fried potatoes were studied. Minerals were determined in samples taken at various stages during processing. Processing of canned vegetables caused a loss in phosphorus and an increase in the Na:K ratios, when salt was added. Freezing vegetables had very little effect on the minerals studied. Processing of peanuts resulted in an increase in Na:K ratios in peanut butter. Mineral content of whole wheat flour was unaffected by milling, whereas the potassium and phosphorus content of white flour was reduced. In tuna, canning in either oil or water affected mineral values. AA .
- 824 NAVEH (D), KOPELMAN (IJ) and MIZRAHI (S). Electroconductive thawing by liquid contact. *J. Food Technol.* 18(2); 1983; 171-6
- 825 VAN BOXTEL (LBJ) and DE FIELLIETTAZ GOETHART (RL). Heat transfer to water and some highly viscous food systems in a water cooled scrapped surface heat exchanger. *J. Food Process. Eng.* 7(1); 1983; 17-35
For water and their starch-based food products (starch content 12-18%) the heat transfer coefficient inside the scrapped cylinder were measured for shaft speeds ranging from 1.67 to 10 revolutions/sec. For the starch-based products, in general, no consistent interactions between mass flow rates and interval heat transfer coefficients were observed. KAR

- 826 RODRIGUEZ (RDP) and MERSON (RL). Experimental verification of a heat transfer model for simulated liquid foods undergoing flame sterilization. *J. Food Sci.* 48(3); 1983; 726-33

Four silicone oils with viscosities ranging from 0.0013 Pa-s to 0.3385 Pa-s were used as model liquid foods to measure the heating rates in a specially-designed single-can flame sterilizer. A previously-developed mathematical heat transfer model was experimentally tested with respect to the effect of liquid viscosity, can rotation, combustion gases crossflow velocity, and can-burner separation. For all the cases studied, order of magnitude agreement was obtained between experimentally measured and predicted heating rates, with experimental values ranging from 0.16 C/s to 0.52 C/s. AA

- 827 NAVEH (D), PFLUG (IJ) and KOPELMAN (IJ). Simplified procedure for estimating the effect of a change in heating rate on sterilization value. *J. Food Prot.* 46(1); 1983; 16-8

The relationship between relative change in temperature response parameter, f , and the sterilization value delivered in a thermal process, is based on numerical differentiation of Ball's formula method and the relative change in sterilization value due to a relative change in heating rate expressed by a dimensionless elasticity term. The function may be employed for g 's upto 30 F and for a temperature range from 3 to 20% in the value of temperature response parameter. BSN

- 828 STEWART (AW). Effect of cooking on bacteriological populations of "soul foods". *J. Food Prot.* 46(1); 1983; 19-20

- 829 UNKLESBAY (N), DAVIS (ME) and KRAUSE (G). Nutrient retention of portioned menu items after infra-red and convective heat processing. *J. Food Sci.* 48(3); 1983; 869-73

- 830 RAMASWAMY (HS), TUNG (MA) and STARK (R). A method to measure surface heat transfer from steam/air mixtures in batch retorts. *J. Food Sci.* 48(3); 1983; 900-904

A method employing transient heating was developed to determine surface heat transfer coefficients associated with steam/air mixtures in batch retorts. The method was based on instantaneous introduction of a highly conductive brick-shaped test block of uniform initial temperature into a heating medium which was prestabilized at the desired temperature and pressure conditions. The results of a study to verify the utility of the method revealed an exponential relationship between the heat transfer coefficient and the steam content of the medium. AA

- 831 KIM (K-H), SCHWARTZBERG (HG) and ROSENAU (JR). Factors affecting performance of brine driven evaporators. *J. Food Process. Eng.* 7(1); 1983; 37-62

Concentrated CaCl_2 and LiCl brines were used to evaporatively concentrate liquid foods. The concentration was carried out in double falling film evaporators in which brine flowed down the outside of the tubes and liquid food flowed down the inside. The vapour spaces between the brine and the food were connected and vapour from the food was absorbed in the brine. The heat generated by vapour absorption in the brine provided the heat needed to sustain evaporation, and was transferred to the food because of the boiling

point elevation of the brine. Evaporation rates approaching those obtained in commercial evaporators were obtained for skim milk, sugar solutions and orange juice. The evaporation rates were affected by flow rates, temperature, concentration and tube material. AA

PACKAGING

- 832 MAHADEVIAH (M), GOWRAMMA (RV) and NARESH (R). Welded OTS cans as an alternative to soldered can. *J. Food Sci. Technol.* (India) 20(5); 1983; 241-2
Welded open top sanitary (OTS) cans were tested for porosity, resistance to strip lacquer, and evaluated for canning of potatoes in brine, tomato paste, mango juice and mango pulp. The ferricyanide and copper sulphate tests did not reveal iron exposure throughout the welded portion, as also there was no peeling of lacquer when dipped in 2% citric acid solution for 30 minutes. Canned potato, and tomato paste were stored at 25-30 C and at 37 C for 12 months, whereas mango pulp was stored for 3 months. Welded cans retained good vacuum and the quality of the products was good and acceptable, except in potatoes stored at 37 C which showed slight metallic taste. Light to heavy feathering with detinning was noticed in the can interior with all the products depending upon the storage period and temperature. KAR
- 833 BUCHNER (N). Aseptic packaging - possibilities and prospects. *Food Flavour. Ingrid. Packag. Process.* 5(11); 1983; 37,39,41-42
Discusses: genesis, sterilisation of product, safety factors, aseptic canning, packages for aseptic filling; and aseptic thermoform, filling and sealing machine - SERVAC 78AS. BSN

FOOD ENGINEERING AND EQUIPMENT

- 834 DE MICHELIS (A) and CALVELO (A). Freezing time predictions for brick and cylindrical-shaped foods. *J. Food Sci.* 48(3); 1983; 909-13,934
A simplified model previously developed for freezing time calculations in plate freezers is extended to systems with two or three dimensional heat flow. The model combines Plank's equation with the unsteady heat transfer solutions for bodies with constant properties, through the addition of pre-cooling, change of phase and tempering times. Average thermal properties, different for each period are used in order to take into account their change with the ice content along the freezing process. Freezing time predictions show a maximum difference of 10% with respect to freezing experiments performed with meat blocks shaped as cylinders or rectangular bricks. Processing times from 0.7-5 hour were compared with satisfactory agreement. AA

ENERGY IN FOOD PROCESSING

- 835 ROTSTEIN (E). The exergy balance: A diagnostic tool for energy optimization. *J. Food Sci.* 48(3); 1983; 945-50
The exergy balance is shown to be a combined statement of the first and second laws of thermodynamics. It provides insight into the energy performance of industrial operations, showing the ideal and actual energy bounds

(exergy change and production of entropy) as well as electrical and other utilities consumption. Calculation of exergies in different situations within the food industry is shown. A tomato paste plant and two heat-optimized configurations of the same are evaluated by means of the exergy balance. A similar analysis is carried out for the case of whey drying. It is concluded that the exergy balance is a useful diagnostic tool for the energy analysis and optimization of the food industry. AA

- 836 MEENA (JR). Solar energy for rural areas. *Vojana*. 28(8); 1984; 25-8

FOOD CHEMISTRY AND ANALYSIS

- 837 BECKEL (RW) and WALLER (GR). Antioxidative arginine-xylose Maillard reaction products: conditions for synthesis. *J. Food Sci.* 48(3); 1983; 996-7

- 838 TROLLER (JA). Water activity measurements with a capacitance manometer. *J. Food Sci.* 48(3); 1983; 739-41

The design, use and performance of a capacitance manometer for the measurement of water activity (a_w) are evaluated. The device consists of a sensitive capacitance sensor for measuring the vapour pressure of a sample. This value is then divided by a known value for the vapour pressure of pure water at a specific temperature to obtain a_w . Precision and accuracy of this instrument are determined and compared to a conventional electric hygrometer. These parameters are similar to the hygrometer; however, the principle advantages of the capacitance manometer may occur in circumstances in which direct measurements of a_w are required and situations in which contamination of hygrometric sensors could occur. AA

- 839 GOLDMAN (M), HOREV (B) and SAGUY (I). Decolourization of β -carotene in model systems simulating dehydrated foods. Mechanism and kinetic principles. *J. Food Sci.* 48(3); 1983; 751-4

The mechanism and kinetic principles of β -carotene decolourization under reduced oxygen (0-20.9%) low water activity ("dry" - 0.84) and 35 C were investigated in a model system. Oxygen was found to be a crucial factor in β -carotene degradation. Rate of decolourization due to oxygen was found to be influenced by the amount of oxygen adsorbed. This amount was influenced by oxygen partial pressure and the physical and chemical structure of the adsorbent β -Carotene decolourization was found to be strongly affected by the presence of free radical initiators. On the other hand, degradation was slowed down when an antioxidant was added. β -Carotene retention curves were sigmoidal with three regions, namely, an induction period, a fast "main" period, and a retardation period - typical of an autocatalytic radical reaction. Water activity was found to play a protective role in β -carotene decolourization. AA

- 840 WALTER (RH), SHERMAN (RM) and LEE (CY). A comparison of methods for polyuron de methoxyl determination. *J. Food Sci.* 48(3); 1983; 1006-7

- 841 WATSON (NZ) and GREEN (NR). Effect of pectin and lignin on mutagenicity in the Ames assay. *J. Food Sci.* 48(3); 1983; 1008-9

- 842 WILLIAMS (ATR) and WINFIELD (SA). Low-temperature luminescence spectroscopy using conduction cooling and a pulsed source luminescence spectrometer. *Analyt.* 108(1293); 1983; 1471-6

FOOD LAWS AND REGULATIONS

- 843 VALLOWE (JM). Informing consumers of the existence and significance of food and drug administration food standards of identity. *Food Drug Cosmet. Law. J.* 38(3); 1983; 256-72

FOOD MICROBIOLOGY

LACTOBACILLUS

- 844 IRWIN (D), SUBDEN (R), LAUTENSACH (A) and CUNNINGHAM (JD). Genetic heterogeneity in *Lactobacilli* and *Leuconostocs* of enological significance. *Can. Inst. Food Sci. Technol. J.* 16(1); 1983; 79-81

PSEUDOMONAS

- 845 BOZOGLU (F), SWAISGOOD (HE) and ADAMS (DM) Jr. Isolation and characterization of an extracellular heat-stable lipase produced by *Pseudomonas fluorescens* MC50. *J. Agric. Food Chem.* 32(1); 1984; 2-6

The extracellular, heat-stable lipase produced by *Pseudomonas fluorescens* MC50 was purified by successive gel chromatography on Sephacryl S-500 and Sephadex G-200. The purified enzyme was homogeneous as judged by gel electrophoretic analyses and exhibited characteristics of a true lipase. Substrates required emulsification to obtain activity; trioctanoin appeared to be best synthetic tri-acylglycerol and coconut oil was the best natural substrate. The activity showed an alkaline pH optimum and was inhibited by treatment with EDTA and partially inhibited by reagents specific for reaction with sulphhydryl groups. Comparison of the amino acid composition with that of pancreatic lipase indicated a relatedness ($S\Delta Q = 90$) of the two enzymes, suggesting possible similar functioning. A subunit weight of 55,000 was estimated by gel electrophoresis in sodium dodecyl sulphate. The hydrodynamic molecular radius obtained by gel chromatography and gel electrophoresis in Triton X-100 was 40 Å. AA

- 846 SWAISGOOD (HE) and BOZOGLU (F). Heat inactivation of the extracellular lipase from *Pseudomonas fluorescens* MC50. *J. Agric. Food Chem.* 32(1); 1984; 7-10

Characteristics of the heat inactivation of a partially purified form of lipase produced by *Pseudomonas fluorescens* MC50 were examined in a simulated milk salt system. At relatively low enzyme concentrations, first-order inactivation was observed in both the low-temperature range (50-90 C) and the high-temperature range (100-150 C). A discontinuity is observed in an Arrhenius plot of the data, yielding two lines with corresponding activation energies of 10.7 kcal/mol in the low-temperature range and 21.8 kcal/mol in the high-temperature range. Also in the high-temperature range biphasic inactivation curves were obtained at high enzyme concentrations. The presence of calcium appeared to stabilize the enzyme in the low-temperature range but had no effect at 150 C. These results suggest that irreversible inactivation in the two temperature ranges is characterized by different denatured states reached from different intermediates having distinctly different degrees of molecular unfolding. AA

YEAST

- 847 OSZLANYL (AG). Instant yeast. *Baker's Dig.* 57(4); 1983; 29-31
 Process for making instant-yeast, its packaging, hydration, glutathione release, and functionality, have been discussed. KAR

FUNGI

- 848 FOGARTY (WM) and BENSON (CP). Purification and properties of a thermophilic amyloglucosidase from *Aspergillus niger*. *European J. Appl. Microbiol. Bio-Technol.* 18(5); 1983; 271-8

FOOD ADDITIVES

- 849 EAPEN (KC), SANKARAN (R) and VIJAYARAGHAVAN (PK). The present status on the use of nisin in processed foods. *J. Food Sci. Technol. (India)* 20(5); 1983; 231-40

The review covers: the need for using nisin; the solubility and stability of nisin in foods; structure; mechanism of action; method of application; use of nisin in foods including cheese, sterilized milk, reconstituted and recombined use in canned products like evaporated milk, milk puddings, canned products like peas, beans, mushrooms, soups, tomato products, asparagus, hams and fruits; estimation of nisin; factors contributing to the loss of nisin potency; biological assay; toxicological aspects; regulations in the use of nisin work done in India on the use of nisin; use of nisin in defence rations and the future prospects and research needs. KAR

- 850 VEERABHADRA RAO (M), KRISHNAMACHARYULU (AG), KAPUR (OP) and PRAKASA SASTRY (CS). Non-aqueous titrimetric determination of food preservatives and non-nutritive sweeteners using internal indicators. *J. Food Sci. Technol. (India)* 20(5); 1983; 202-5

Oracet blue B, Sudan blue GN, Sudan green 4B (amino anthraquinone dyes) and Resazurin have been used for the first time as internal indicators in the nonaqueous titrimetric determination of food preservatives such as, sodium benzoate, sodium propionate, sodium salicylate and non-nutritive sweeteners such as, sodium saccharin and sodium cyclamate employing acetous perchloric acid as titrant. The use of Azur A, Azur C, Toluidine blue O (thiazine dyes) and Bromo pyrogallol red is studied for their suitability in the titrations employing sodium methoxide as titrant for determination of acid forms of the above preservatives and non-nutritive sweeteners, sorbic acid and p-hydroxy benzoic acid. The results are accurate with a maximum percentage error of 0.1, 0.8 and 2.5 for macro, semi-micro and micro titrations respectively. The recoveries of added preservatives and non-nutritive sweeteners to food products are reported. Photometric titrations are also described. AA

- 851 HOLMQUIST (GU), WALKER (HW) and STAHR (HM). Influence of temperature, pH, water activity and antifungal agents on growth of *Aspergillus flavus* and *A. parasiticus*. *J. Food Sci.* 48(3); 1983; 778-82

- 852 BERNER (LA) and HOOD (LF). Iron binding by sodium alginate. *J. Food Sci.* 48(3); 1983; 755-8

- 853 EUBANKS (VL) and BEUCHAT (LR). Combined effects of antioxidants and temperature on survival of *Saccharomyces cerevisiae*. *J. Food Prot.* 46(1); 1983; 29-33
- 854 SOEJARTO (DD), COMPADRE (CM), MEDON (PJ), KAMATH (SK) and KINGHORN (AD). Potential sweetening agents of plant origin. II. Field search for sweet-tasting *Stevia* species. *Econ. Bot.* 37(1); 1983; 71-9
Field work carried out in Paraguay, Peru, Colombia and Mexico indicated that no other species of *Stevia* possessed a potent sweet taste comparable to that of *S. rebaudiana*. KAR
- 855 TAYLOR (AH). Encapsulation systems and their applications in the flavour industry. *Food Flavour. Ingrid. Packag. Process.* 5(9); 1983; 48,49,51-2
Discusses the advantages and disadvantages of spray drying, spray cooling, spray chilling, gelatine encapsulation, gelatine micro-encapsulation and low temperature encapsulation systems for encapsulation of flavours. BSN
- 856 KRUEGER (DA) and KRUEGER (HW). Carbon isotopes in vanillin and the detection of falsified "natural" vanillin. *J. Agric. Food Chem.* 31(6); 1983; 1265-8
A method has been developed for quantitative removal of the methyl group carbon from vanillin and determination of its isotopic composition. The method is of value for the detection of synthetic vanillins whose isotopic compositions have been adjusted by the addition of (methyl-¹³C)vanillin to resemble natural vanillins. AA
- 857 JOHN COUNSELL and CONRAD KNEWSTUBB. Some of nature's food colours - carotenoids and riboflavins. *Food Flavour. Ingrid. Process. Packag.* 5(8); 1983; 18-9,21,23
- 858 PEARCE (A) and HUME (AF). Synthetic food colours today. *Food Flavour. Ingrid. Process. Packag.* 5(8); 1983; 26-7,29
- 859 JENSEN (NJ), WILLUMSEN (D) and KNUDSEN (I). Mutagenic activity at different stages of an industrial ammonia caramel process detected in *Salmonella typhimurium* TA100 following pre-incubation. *Food Chem. Toxicol.* 21(5); 1983; 527-30
Mutagenic activity of a commercial ammonia caramel colouring was demonstrated in *Salmonella typhimurium* TA100 without metabolic activation. The activity in strain TA100 was increased using a 10-minutes pre-incubation, and a clear dose-response relationship was seen using this method. Investigation of samples taken from the different stages in the industrial process showed a constant level of mutagenic activity in samples from the middle to the end of the heating process with a steep increase in the sample taken after the end of heating. No mutagenic activity was seen in assays with *S. typhimurium* strains TA1535 and TA98. AA
- 860 FLACK (EA). The use of emulsifiers to modify the texture of processed foods. *Food Flavour. Ingrid. Process. Packag.* 5(8); 1983; 32-7
- 861 WALKER (N). EEC production and usage of emulsifiers. *Food Flavour. Ingrid. Process. Packag.* 5(8); 1983; 38-9

CEREALS

- 862 MATHEWSON (PR) and SEABOURN (BW). A new procedure for specific determination of β -amylase in cereals. *J. Agric. Food Chem.* 31(6); 1983; 1322-6

This method utilizes a commercially available colorimetric substrate consisting of p -nitrophenyl oligosaccharides. Results are linear with β -amylase concentration over a wide range of activity. Tests in which increasing amounts of cereal α -amylase were added to a constant amount of β -amylase showed no significant increase in absorbance using this substrate. Under the same conditions, the commonly used Bernfeld assay for β -amylase activity showed an increased response. Using a new substrate, we observed a constant response for wheat samples with increasing degree of sprouting. This substrate was also found to be useful for the determination of fungal α -amylase activity. AA

- 863 KING (RR), GREENHALGH (R) and BLACKWELL (BA). Oxidative transformation of deoxynivalenol (vomitoxin) for quantitative and chemical confirmatory purposes. *J. Agric. Food Chem.* 32(1); 1984; 72-5

A simple and rapid method for the confirmation of deoxynivalenol residues in cereal crops was developed. The reaction involves a one-step treatment with aqueous perodate or freshly precipitated lead dioxide. Deoxynivalenol is quantitatively converted into a unique seven-membered ring lactone analogue. The trifluoroacetylated conversion product could be quantitated at levels equivalent to 0.05 ppm by electron capture gas-liquid chromatography. 3-Acetoxydeoxynivalenol was shown to undergo a similar oxidative transformation. AA

- 864 HOSENEY (RC) and BROWN (RA). Mixograph studies. V. Effect of pH. *Cereal Chem.* 60(2); 1983; 124-6

Decreasing the pH of flour-water dough gave mixograms with decreased mixing stability. Increasing the pH of flour-water dough gave mixograms with longer mixing times and greater mixing stability. Tenox (a mixture of butylated hydroxytoluene and butylated hydroxyanisole) did not reverse the effect of low pH, showing that the mechanism by which low pH affects mixing stability is different from that by which activated double-bond compounds affect mixing stability. Fumaric acid and potassium iodate effectively decreased mixing stability at pH 6.12, but not at higher or lower pHs. Thus, activated double-bond compounds are necessary only at a pH near that of flour-water ($\sim$ pH 6.0). The effect of pH on the flour-water mixogram stability is reversible. The data are consistent with the theory that the thin-mixogram tail indicates a conformational change in the gluten proteins as a result of overmixing. AA

RICE

- 865 BOWREY (RG) and INTONG (CL). Pressure losses in ventilated paddy rice stores. *Food Technol. Aust.* 35(2); 1983; 78-9

Two varieties of paddy rice were ventilated at 5 superficial air velocities using four combinations of air temperature and RH. Four grain moisture contents were used and experiments were carried out using range of porosities. Variety was found to be the most important factor affecting porosity. Equations are given for predicting pressure drop in ventilated paddy rice. KAR

- 866 MOSSMAN (AP), FELLERS (DA) and SUZUKI (H). Rice stickiness. I. Determination of rice stickiness with an Instron tester. *Cereal Chem.* 60(4); 1983; 286-92

The coefficient of variation (S/x) for the instron tester used for measuring surface stickiness of rice was less than 5%. The factors in cooking and handling which influence increase of this factor to 15% have been discussed. Reproducibility was substantially improved by optimizing the water to rice ratio used in cooking. BSN

- 867 FELLERS (DA), MOSSMAN (AP) and SUZUKI (H). Rice stickiness. II. Application of an Instron method to make varietal comparisons and to study modification of milled rice by hot-air treatment. *Cereal Chem.* 60(4); 1983; 292-5

An objective Instron method was used to measure the stickiness of samples from 12 rice varieties. Long-grain rices as a class were statistically differentiated from medium- and short-grain rices. The substantial variation in the method allows statistically significant differentiation among various medium- and short-grain rices only when stickiness differences are quite large, i.e. 0.8 gram cm. Reduction in stickiness by treatment of milled rice with a hot-air (149-260 C) blast was readily followed. At 204 C, stickiness of Calrose was reduced from 3.1 gram cm to 1.6 gram cm in 15 seconds and to 0.4 gram cm in 30 seconds, the latter value being typical of long-grain rice. Loss of gloss, sweet flavour, whiteness, and storage stability also accompanied hot-air treatments. Organoleptically determined stickiness of hot air-treated rices correlated at $r = 0.98$ with results from the Instron method. Plasma treatments of milled rices increased stickiness. Heating rice that had been immersed in safflower oil at 60 C reduced stickiness. AA

WHEAT

- 868 MAYFIELD (J). Calculating germ value to save wasted flour. *Indian Miller.* 14(1); 1983; 5-13

Measurement of germ value for monitoring flour milling by use of near infra-red machines, as practiced by Arnott's Research Centre, Australia, has been described. MVG

- 869 SHURPALEKAR (SR), RAHIM (A), VENKATESWARA RAO (G) and VATSALA (CN). A simple process for milling of wheat for bakery flour and atta. *Indian Miller.* 14(1); 1983; 25-7

A process has been developed which uses indigenously available machinery for obtaining simultaneously flour suitable for bakery products and atta suitable for chapati or roti. The process has the advantage of easy adaptability to operate on service charge basis, whereby the desired quality bakery flour can be obtained by processing selected wheat. This convenience is of great importance to small-scale bakers who have no facilities for quality control needed for adopting corrective procedures. MVG

- 870 RAHIM (A), VENKATESWARA RAO (G) and SHURPALEKAR (SR). A small scale process for milling of wheat. Part I. Development of the process. *J. Food Sci. Technol.* (India) 20(5); 1983; 191-5

A simple, small scale wheat milling process using indigenous machinery has been developed. The process consists of debranning of cleaned wheat in a huller, grinding of polished wheat in chakki and mechanical sieving. Trials with 5-10 kg of wheat was carried out in Huller No.3 after 3-6% addition

of water and 5-15 minutes rest period. Huller screens of different types and sizes were used. Huller No.1 was tried with 100 kg polishing/hour with moistening (2-6%) and rest period (5 minutes 5-10% bran was removed in single pass and 10-12% in double pass). In Huller No.3, optimum polishing was achieved with 4-5% water for conditioning and rest period of 5-10 minutes, when 5-7% bran was removed without any loss of endosperm. In Huller No.1, with the 4-5% water and rest period of 5-10 minutes, with a feed rate of 2 kg/minutes was found optimum; a second pass could give 10-12% polish when the feed rate could be 5 kg/minute. Grinding was done using chakki consisting of 2 corrugated metallic discs. Semolina of desirable particle size could also be obtained from polished wheat using chakki. Regrinding coarse fraction, would give atta suitable for roti/chapati preparation. A set of 40, 60, 80 and 100 mesh sieves was found suitable for separating different fractions; bread flour (30-35%) or biscuit flour (30-40%) could be separated using 100 mesh sieve when the remaining flour (50-65%) will be suitable for roti/chapati. The process could be employed for durum semolina milling with some variations in grinding and by using sieves for 18,30,50 and 80 mesh, whereby 55-60% semolina of different fineness and 30-40% roti/chapati atta could be obtained. KAR

- 871 COLE (EW), TORRES (JV) and KASARDA (DD). Aggregation of A-gliadin: Gel permeation chromatography. *Cereal Chem.* 60(4); 1983; 306-10
- 872 EBELLER (SE) and WALKER (CE). Wheat and composite flour chapaties: Effects of soy flour and sucrose-ester emulsifiers. *Cereal Chem.* 60(4); 1983; 270-75
- The effect of addition of soyflour and emulsifiers upon chapaties baked from wheat, sorghum, pearl and proso millets was studied. It was observed that visual scores and instron shear force values decreased approximately linearly with percent non wheat flour. Dough handling characteristics or tenderness of chapati was not improved by addition of sucrose ester emulsifiers. BSN
- 873 JONES (BL), FINNEY (KF) and LOOKHART (GL). Physical and biochemical properties of wheat protein fractions obtained by ultracentrifugation. *Cereal Chem.* 60(4); 1983; 276-80
- 874 DICK (JW) and QUICK (JS). A modified screening test for rapid estimation of gluten strength in early-generation durum wheat breeding lines. *Cereal Chem.* 60(4); 1983; 315-8
- 875 SMITH (LB). The relationship between wet grain, *Cryptolestes ferrugineus* (Coleoptera: cucujidae) populations and heating in wheat stored in granaries. *Can. Entomol.* 115(10); 1983; 1383-94
- Water added to wheat in the Prairie Provinces of Western Canada promotes heating in the autumn and early winter. A rapid increase in the population of *C. ferrugineus* where the wheat was wet occurred after heating began and was, therefore, a consequence of the heating and not a cause. KAR
- 876 ANDEREGG (BN) and MADISEN (LJ). Effect of insecticide distribution and storage time on the degradation of (^{14}C)malathion in stored wheat. *J. Econ. Entomol.* 76(5); 1983; 1009-13
- The degradation of ^{14}C -malathion ((1,2- ^{14}C) ethyl label) in stored wheat in which 5 or 100% of the kernels were treated with the same overall amount of insecticide was investigated over a 12-month period. There was no differ-

ence in the degradation of the insecticide in either treatment. Over the 1-year storage period, quantities of chloroform-soluble radiocarbon decreased, whereas those of water-soluble and unextractable residues increased. Quantities of volatile radiocarbon reached a peak after 6 months of incubation. *Tribolium castaneum* (Herbst) developed more slowly in the presence of unextractable residues than in their absence, although these bound residues were not acutely toxic to adult beetles and did not affect the number of progeny. AA

- 877 MA (C-Y) and HARWALKAR (VR). Chemical characterisation and functionality of oat protein fractions. *J. Agric. Food Chem.* 32(1); 1984; 144-9

QUINOA

- 878 ATWELL (WA), PATRICK (BM), JOHNSON (LA) and GLASS (RW). Characterization of quinoa starch. *Cereal Chem.* 60(1); 1983; 9-11

MILLETS

PEARL MILLET

- 879 SIMWEMBA (CG), HOSENEY (RC), VARRIANO-MARSTON (E) and ZELEZNAK (K). Certain B vitamin and phytic acid contents of pearl millet (*Pennisetum americanum* (L.) Leeke). *J. Agric. Food Chem.* 32(1); 1984; 31-4

MAIZE

- 880 LANDRY (J), PAULIS (JW) and FEY (DA). Relationship between alcohol-soluble proteins extracted from maize endosperm by different methods. *J. Agric. Food Chem.* 31(6); 1983; 1317-22

The glutelin fraction of maize protein is retained in the residual meal after extraction of salt-soluble proteins and zein and is solublized only after disruption of its disulphide bonds. Using varied solvent systems, different researchers have fractionated reduced glutelin into components with different properties; like zein, some of these polypeptides are soluble in aqueous ethanol. In this study, the compositions of the fractions extracted from glutelin with a solvent consisting of 63% ethanol containing sodium acetate and mercaptoethanol were compared to those of proteins obtained by sequential two-step procedures consisting of 55% 2-propanol with mercaptoethanol followed by 55% 2-propanol containing mercaptoethanol and sodium acetate or by a pH 3 lithium chloride solution containing mercaptoethanol. The relationships of these proteins and similar alcohol-soluble proteins are discussed. AA

- 881 OWUSU-ANSAH (J), van de VOORT (FR) and STANLEY (DW). Physicochemical changes in cornstarch as a function of extrusion variables. *Cereal Chem.* 60(4); 1983; 319-24

The physicochemical characteristics of corn starch (temperature, feed moisture and screw speed effect on gelatinization, water absorption index, water solubility and cooked viscosity of starch) as influenced by extrusion were found to be significant in their first order terms except in case of water solubility. These responses were linearly and quadratically related to variables and accounted for more than 90% of the total variation. However, water solubility was not quadratically related to the extrusion variables, but increased with increasing temperature and moisture content. BSN

- 882 LOPEZ (Y), GORDON (DT) and FIELDS (ML). Release of phosphorus from phytate by natural lactic acid fermentation. *J. Food Sci.* 48(3); 1983; 953-4,985
- 883 BUDKE (CC). Determination of total available glucose in corn base materials. *J. Agric. Food Chem.* 32(1); 1984; 34-7
- The procedure consists in the gelatinisation of the material with water at 122 C, conversion of starch and glucose polymers to free glucose with alpha amylase and amyloglucosidase at 55 C, and determination of glucose by using YSI analyser. JVS
- 884 LANDRY (J) and SALLANTIN (M). Polymorphism of native zein as detected by gel filtration and electrophoresis in the presence or absence of sodium dodecyl sulphate. *Cereal Chem.* 60(3); 1983; 242-5
- 885 VANCAUWENBERGE (JE), LAGODA (AA), BOTHAST (RJ), ALLEN (SE) and FAREY (GC) Jr. Captan-treated seed corn in alcohol production. *J. Agric. Food Chem.* 32(1); 1984; 75-8
- 886 SZETO (SY), WILKINSON (ATS) and BROWN (MJ). A gas chromatographic method for the determination of bendiocarb in soil and corn: Application to the analysis of residues in corn. *J. Agric. Food Chem.* 32(1); 1984; 78-80

SORGHUM

- 887 ASQUITH (TN), IZUNO (CC) and BUTLER (LG). Characterization of the condensed tannin (proanthocyanidin) from a group II sorghum. *J. Agric. Food Chem.* 31(6); 1983; 1299-303
- 888 HAHN (DH), FAUBION (JM) and ROONEY (LW). Sorghum phenolic acids, their high performance liquid chromatography separation and their relation to fungal resistance. *Cereal Chem.* 60(4); 1983; 255-9
- 889 SUBRAMANIAN (V), BUTLER (LG), JAMBUNATHAN (R) and PRASADA RAO (KE). Some agronomic and biochemical characters of brown sorghums and their possible role in bird resistance. *J. Agric. Food Chem.* 31(6); 1983; 1303-7
- 890 UWAIFO (AO). Biological and biochemical changes in two Nigerian species of sorghum (SK.5912 and HP3) following premalting- γ -irradiation treatment. *J. Agric. Food Chem.* 31(6); 1983; 1292-5
- Two Nigerian species of sorghum - *Sorghum acaudatum* (SK.5912) and *Sorghum guineense* (HP3) - were γ -irradiated prior to malting on a Cobalt irradiator. The species were exposed to the following doses - 0.22, 0.44, 1.76, and 4.95 krd - in the assays for diastatic power, β -amylase, and α -amylases, while in the assays for germinative energy and lengths of rootlets and

acrospire they were exposed to a dose range of 0-5 krd. A dose of 1.76 krd raised the diastatic power, β -amylase, α -amylase, germinative energy, and lengths of rootlets and acrospire maximally relative to those of the unirradiated sorghum in the species studied. This effect of 1.76 krd was, however, higher in SK.5912 species than in HP3 species. This dose also raised DNA levels in the two species relative to that of the unirradiated species but had the reverse effect on protein levels in the two species. AA

- 891 BEDOLLA (S), De PALACIOS (MG), ROONEY (LW), DIEHL (KC) and KHAN (MN). Cooking characteristics of sorghum and corn for tortilla preparation by several cooking methods. *Cereal Chem.* 60(4); 1983; 263-8

- 892 GLENNIE (CW). Polyphenol changes in sorghum grain during malting. *J. Agric. Food Chem.* 31(6); 1983; 1295-9

Bird-resistant and non-bird-resistant sorghum cultivars were malted to study the effects of tannin on malting as well as the change in polyphenols during malting. No difference could be found in the present germination nor in the root and shoot production of the malts of the two cultivars. There was an increase in the anthocyanidin content of the roots and shoots during malting. Since there was also an increase in the anthocyanidin content of the non-bird-resistant kernels, it would appear that there is no migration of anthocyanidins from the kernels to the roots and shoots. A transmission electron micrograph of the testa after malting showed a testa very similar to that before malting. The tannin in the bird-resistant sorghum picked up extra protein or peptides during malting. Although it was difficult to establish the source of this extra material, amino acid analysis suggested that it was not from the prolamin storage protein in the endosperm. AA

- 893 OKON (EU) and UWAIFO (AO). Partial purification and properties of β -amylase isolated from *Sorghum bicolor* (L.) Moench. *J. Agric. Food Chem.* 32(1); 1984; 11-4

β -Amylase was extracted from *Sorghum bicolor* (L.) Moench variety L.187 and purified by ammonium sulphate fractionation followed by gel filtration on Sephadex G-200. The yield of β -amylase activity in the final purification was 54% of the original activity and specific activity was increased approximately 5-fold. Three components were separated with molecular weights of 20,000, 40,000, and 80,000 based on the selectivity curve for the Sephadex column determined with standard proteins. All components were enzymically active. The enzyme had a pH optimum of 5.0-5.5 and an energy of activation of 57.48 J mol⁻¹ between 10 and 40 C. The calculated V_{max} and K_m values for the enzyme were 7.466×10^{-3} enzyme units and 1.272 g of starch/L, respectively. The results are compared with those reported for other cereals like barley and wheat that are of industrial importance. AA

- 894 TAYLOR (JRN), SCHUSSLER (L) and van der WATT (WH). Fractionation of proteins from low-tannin sorghum grain. *J. Agric. Food Chem.* 32(1); 1984; 149-54

Protein fractionation was done on 16 South-African grown sorghums and 25 economically important collections. Nearly 50% of the protein was found to be in the form of prolamines; 25% consisted of albumins + globulins + low molecular weight nitrogen. The remaining was glutelin fraction. JVS

BARLEY

- 895 MARCHYLO (BA) and MacGREGOR (AW). Separation of barley malt alpha-amylase by chromatofocusing. *Cereal Chem.* 60(4); 1983; 311-4
- 896 DeHASS (BW) and GOERING (KJ). Barley starch. VII. New barley starches with fragmented granules. *Cereal Chem.* 60(4); 1983; 327-9
- 897 AHOKAS (H). A simple and inexpensive visual method for distinguishing between high-lysine and normal-lysine barley kernels. *Cereal Chem.* 60(4); 1983; 330-32

PULSES

- 898 UDAYASEKHARA RAO and DEOSTHALE (YG). Effect of germination and cooking on mineral composition of pulses. *J. Food Sci. Technol.* (India) 20(5); 1983; 195-7

Dehusked (i) green gram and (ii) black gram and converted into dhal split bran, and (iii) unhusked pigeon pea were germinated for 24 and 48 hours and the mineral contents (ash, P, Phytin P, Mg, Fe, Zn and Cu) of cooked dhal were studied. Dehusking did not result in significant nutrient losses. By soaking for 24 hours (i) and (ii) lost 20-48% of ash, Fe and Cu. Germination per se affected only the phytin P content during 48 hours of germination in (i) and (ii). Losses of minerals during cooking of raw and germinated (i) and (ii) were significant, while in (iii) the losses were relatively low because of the intact seed coat during soaking, germination and cooking. KAR

- 899 SOSULSKI (FW) and DABROWSKI (KJ). Composition of free and hydrolyzable phenolic acids in the flours and hulls of ten legume species. *J. Agric. Food Chem.* 32(1); 1984; 131-3

The phenolic constituents in the defatted flours and hulls of 10 legume species were fractionated into free acid, soluble ester, and residue components, followed by alkaline hydrolysis and quantitation by capillary gas-liquid chromatography. The flours contained only soluble esters, and hydrolyses revealed the presence of *trans*-ferulic, *trans*-p-coumaric, and syringic acids in nearly all species. Mung bean, field pea, lentil, fababean, and pigeon pea contained only 2-3 mg of phenolic acids/100 g of flour, but higher levels were obtained in navy bean, lupine, lima bean, chickpea, and especially, cowpea. The hulls contained *p*-hydroxybenzoic, protocatechuic, syringic, gallic, *trans*-p-coumaric, and *trans*-ferulic acids in the soluble ester fraction and, to a lesser extent, in the insoluble residue. Dehulling would reduce the phenolic composition of the flour substantially for pigeon pea, fababean, mung bean and lentil but would have little effect on the phenolic composition of field pea, navy bean, lima bean, or chickpea products. AA

- 900 RATTAN SINGH, GEORGE (M) and SONI (GL). Role of dietary fiber from pulses as hypocholesterolemic agent. *J. Food Sci. Technol.* (India) 20(5); 1983; 228-30

Dietary fibers from (i) green gram, (ii) black gram (iii) Bengal gram, (iv) lentil and (v) peas were fed to rats along with hypercholesterolemic

diet at 5% level for 4 weeks to determine their hypocholesterolemic action. Lipid levels of plasma, liver, heart and bile acid secretion of the animal were determined. Bengal gram showed the maximum hypocholesterolemic effect followed by black gram, green gram, peas and lentil. The cholesterol levels in rats fed with fiber of (i) - (iv) were significantly lower; feeding of fibers of (i) - (iii) lowered total lipid, cholesterol and glycerides + free fatty acid contents, but did not affect the phospholipid levels of the heart. Bile acid excretion in group receiving dietary fiber from (i) - (iii) is significantly higher. *In vitro* absorption of bile acids by these fibers showed that absorption of deoxycholic acid was more than that of chenodeoxycholic acid and cholic acid. Hypercholesterolemic action was inversely related to the water holding capacity of the fiber; but no direct relation could be deduced to their bile acid adsorption capacity. KAR

PEA

- 901 BHATTY (RS) and PATEL (PR). Electrophoretograms of peas and skim milk proteins hydrolyzed *in vitro* with pepsin and rennin. *J. Agric. Food Chem.* 31(2); 1983; 297-300

Three protein products, pea protein isolate, pea protein concentrate, and reconstituted skim milk, were hydrolyzed *in vitro* with commercial pepsin and rennin for 0.25-22 h. The peptide bond-hydrolysis was determined by reaction with 2,4,6-trinitrobenzenesulphonic acid. The order of hydrolysis of the three proteins by pepsin was PPI > PPC > SM and by rennin was SM > PPI > PPC. In general, the pea protein isolate and pea protein concentrate proteins appeared to be more susceptible to pepsin, and skim milk proteins, as expected, appeared to be more susceptible to rennin. The sodium dodecyl sulphate-polyacrylamide gel electrophoretic patterns of PPI and PPC showed that proteins having a molecular weight between 70,000 and 300 000 were preferentially hydrolyzed, although several protein bands were still present after 22 hours of hydrolysis, suggesting the presence of resistant proteins or peptides. The preferentially hydrolyzed proteins were probably acidic proteins or subunits, and their relative ease of hydrolysis may be related to their chemical composition and/or structure. AA

- 902 JOHNSON (EA) and BREKKE (CJ). Functional properties of acylated pea protein isolates. *J. Food Sci.* 48(3); 1983; 722-5

BROAD BEAN

- 903 LATTANZIO (V), BIANCO (VV), CRIVELLI (G) and MICCOLIS (V). Variability of amino acids, proteins, vicine and convicine in *Vicia faba*. *J. Food Sci.* 48(3); 1983; 992-3

Samples of 10 varieties of broad bean were analyzed for dry matter, crude protein, amino acids and alkaloid glucosides. The varieties "Korunde" and "Supersimonia" showed the highest protein content; the amino acid composition was similar in all varieties. Sulphur amino acids were limiting in all tested varieties. The varieties "Gemini" and "Locale di Putignano" showed the highest content of total alkaloid glucosides. It was noticed that variety "Supersimonia", able to produce 1870 kg/ha, shows also a high protein content and a low antinutritional factor content. AA

COW PEA

- 904 ONWUKA (ND). An appraisal of the cooking quality enhancement of cowpea by Kaun (Akanwu). *J. Food Sci. Technol. (India)* 20(5); 1983; 198-201

Kaun (Akanwu), (an admixture of 98% Trona (Na_2CO_3 , $\text{NaHCO}_3 \cdot 2\text{H}_2\text{O}$) and traces of silica, sodium and magnesium chloride, aluminium oxide and calcium carbonate) at different concentrations (0.1 to 0.5 g) was used to cook cowpea (50 g) for 5-20 minutes at 115 C and the cooked product was tested for organoleptic qualities. Increase in concentration of Kaun decreased cooking time, altered the texture and increased the non-enzymatic browning reaction. The optimum Kaun to cowpea ratio was 1:250 (w/w); at lower ratios the product becomes salty and develops offensive odour. Comparison of Kaun with NaOH and KOH showed that the effect is more pronounced with NaOH. With increase in the concentration, of Kaun the water uptake rate increases and concentration of glucose in the cooked material decreases. Use of Kaun also results in saving of energy which compensates for the additional cost of Kaun. KAR

HARICOT BEAN

- 905 BRESSANI (R), ELIAS (LG), WOLZAK (A), HAGERMAN (AE) and BUTLER (LG). Tannin in common beans: Methods of analysis and effects on protein quality. *J. Food Sci.* 48(3); 1983; 1000-1001

Condensed tannins and related phenols in 13 samples of red Guatamalan common beans (*Phaseolus vulgaris*) were determined by four chemical assays. The results were highly correlated although the degree of variation among the samples differed greatly according to the assay. In rat feeding trials, tannin content was negatively correlated with net protein ratio, a measure of protein quality, and positively correlated with protein digestibility. Neither correlation was statistically significant due primarily to the low tannin content of the diet. Methionine supplementation not only improves the protein quality but may also play a role in metabolic detoxification of tannin. AA

- 906 TSUKAMOTO (I), MIYOSHI (M) and HAMAGUCHI (Y). Purification and characterisation of three trypsin inhibitors from beans, *Phaseolus vulgaris* 'kintoki'. *Cereal Chem.* 60(4); 1983; 281-6

MESQUITE BEAN

- 907 DEL VALLE (FR), ESCOBEDO (M), MUNOZ (MJ), ORTEGA (R) and BOURGES (H). Chemical and nutritional studies on mesquite beans (*Prosopis juliflora*). *J. Food Sci.* 48(3); 1983; 914-9

MUNG BEAN

- 908 FARHANGI (M) and GUY VALADON (LR). Effect of light, acidified processing and storage on carbohydrates and other nutrients in mung bean sprouts. *J. Sci. Food Agric.* 34(11); 1983; 1251-6

- 909 ABOU-FADEL (OS) and MILLER (LT). Vitamin retention, colour and texture in thermally processed green beans and Royal Ann cherries packed in pouches and cans. *J. Food Sci.* 48(3); 1983; 920-23
- Thiamin (B-1) ascorbic acid (AA) and vitamin B-6 (B-6) were determined in pouched and canned green beans immediately after processing and after storage at 24-26 C or 38 C. AA and B-6 were also determined in pouched and canned cherries before and after storage at 24-26 C. There was significantly more B-1 and AA in drained pouched green beans, and more AA in drained pouched cherries than in canned ones. B-6 values in the solids of the pouched and canned products were not significantly different. These three vitamins were significantly reduced in drained pouched and canned green beans after storage at 38 C. B-6 was significantly reduced in the stored cherries. Compared to canned, the pouched products were brighter and firmer in texture. AA
- 910 CHEN (K-H), McFEETERS (RF) and FLEMING (HP). Fermentation characteristics of heterolactic acid bacteria in green bean juice. *J. Food Sci.* 48(3); 1983; 962-6
- 911 CHEN (K-H), McFEETERS (RF) and FLEMING (HP). Complete heterolactic acid fermentation of green beans by *Lactobacillus cellobiosus*. *J. Food Sci.* 48(3); 1983; 967-71
- 912 CHEN (K-H), McFEETERS (RF) and FLEMING (HP). Stability of mannitol to *Lactobacillus plantarum* degradation in green beans fermented with *Lactobacillus cellobiosus*. *J. Food Sci.* 48(3); 1983; 972-74, 981

WINGED BEAN

- 913 TAN (N-H), RAHIM (ZHA), KHOR (HY) and WONG (KC). Chymotrypsin inhibitor activity in winged beans (*Psophocarpus tetragonolobus*). *J. Agric. Food Chem.* 32(1); 1984; 163-6
- Chymotrypsin inhibitor activity of winged beans (*Psophocarpus tetragonolobus*) was investigated. Extractability of the inhibitors by aqueous solution increases with increasing pH. The chymotrypsin inhibitor activity in winged bean meal was extremely resistant to dry heat treatment. Prolonged boiling (60 minutes) of the bean was required to destroy the inhibitor activity. Autoclaving is more effective in destroying the chymotrypsin inhibitor activity in the bean meals: 20 minutes of autoclaving at 120 C, 1.05 kg/cm², generally destroyed more than 90% of the inhibitor activity. There are some varietal variations in the thermal stability of winged bean chymotrypsin inhibitor activity. The chymotrypsin inhibitor activity in the winged bean meal extract is heat labile. AA

OILSEEDS AND NUTS

- 914 DABROWSKI (KJ) and SOSULSKI (W). Composition of free and hydrolyzable phenolic acids in defatted flours of ten oilseeds. *J. Agric. Food Chem.* 32(1); 1984; 128-30
- The phenolic compounds in 10 oilseed flours were separated into free, esterified, and bound residue phenolic acids, and the liberated phenolic acids were quantitated by capillary gas-liquid chromatography. Phenolic acids

were not present in the free form; soluble esters yielded the major proportion of phenolic compounds, but most flour residues also contained small, hydrolyzable quantities of the same phenolic compounds. *p*-Hydroxybenzoic, *trans*-*p*-coumaric, *trans*-ferulic, and *trans*-caffeic acids in the ester form occurred in all flours, with syringic acid also being a common constituent. Coconut, cottonseed, and sesame contained low concentrations of total phenolic acid esters. Soyabean, flax, safflower, and peanut were intermediate in total phenolics, the principal acids obtained on hydrolysis of esters being syringic, *trans*-ferulic, *trans*-sinapic, and *trans*-*p*-coumaric acids, respectively. *p*-Hydroxybenzoic acid occurred in high concentrations in mustard, *trans*-sinapic acid in rapeseed and mustard, and chlorogenic acid in sunflower flour. AA

COTTONSEED

- 915 JADDOU (H), AL-HAKIM (M), AL-ADAMY (LZ) and MHAISEN (MT). Effect of gamma-radiation on gossypol in cottonseed meal. *J. Food Sci.* 48(3); 1983; 988-9

The effect of gamma-radiation, in the range 5-30 KGy on free, total and pure gossypol was investigated in an attempt to reduce or eliminate gossypol from cottonseed meal using different solvent systems. Maximum reduction in gossypol concentration was attained at a dose of 25 KGy of gamma-radiation with chloroform as a solvent, a spectrometric method was used for analysis. The reductions attained for pure, free and total gossypol were found to be 96%, 60% and 80%, respectively. AA

RAPESEED

- 916 SERRAINO (MR) and THOMPSON (LU). Removal of phytic acid and protein-phytic acid interactions in rapeseed. *J. Agric. Food Chem.* 32(1); 1984; 38-40

Complete removal of phytic acid from rape protein concentrate (RPC) without nitrogen loss was possible by treatment with phytase. More adjustment of pH of RPC to 3.5 and of rapeseed flour (RF) to 5.15 caused 73% and 88% loss of phytic acid respectively. Dialysis of RF (without pH preadjustment) at pH 5.8 removed upto 67% of phytic acid. JVS

- 917 KOZLOWSKA (H), ROTKIEWICZ (DA), and ZADERNOWSKI (R). Phenolic acids in rapeseed and mustard. *J. Am. Oil Chem. Soc.* 60(6); 1983; 1119-23

The compositions of free phenolic acids in rapeseed flours of diverse origin and white mustard were highly variable but represented less than 10% of the total phenolic acids. Phenolic acids released from hydrolysis of soluble esters constituted the major fraction, with Polish varieties having higher levels than a Canadian variety or white mustard. Yellow Sarson contained low levels of phenolic acids. Sinapic acid isomers constituted over 94% of the 13 phenolic acids found in the rapeseed varieties. Only traces of several phenolic acids appeared to be structurally bound to rapeseed and mustard proteins and carbohydrates. AA

SOYABEAN

- 918 ELDRIDGE (AC). Chemical comparison of a Mexican soyabean variety with a US variety. *J. Am. Oil Chem. Soc.* 60(6); 1983; 1132-4

The proximate analysis, protein, amino acid, and fatty acid composition and flavour evaluation of mature seeds of a commercial variety soyabeans grown in Mexico and of one grown in the United States were compared. The study indicated very little difference between the two varieties. AA

- 919 LEE (C-H), KIM (CS) and YANG (H-C). Microstructure and hydrodynamic properties of soyabean protein bodies in solutions. *J. Food Sci.* 48(3); 1983; 695-702
- 920 URBANSKI (GE), WEI (LS), NELSON (AI) and STEINBERG (MP). Flow characteristics of soyabean constituents controlled by ratio of total to iribibed water. *J. Food Sci.* 48(3); 1983; 691-4
- 921 BABAJIMOPOULOS (M), DAMODARAN (S), RIZVI (SSH) and KINSELLA (JE). Effects of various anions on the rheological and gelling behaviour of soy proteins: thermodynamic observations. *J. Agric. Food Chem.* 31(6); 1983; 1270-75
- The effects of neutral salts on the gelation of soy protein isolate and the 7S and 11S protein fractions were studied. The relative effects of salts on the viscosities of progel and gel followed the lyotropic series for anions, i.e., $\text{SO}_4^{2-} < \text{Cl}^- < \text{Br}^- < \text{SCN}^-$. NaSCN, which is a protein structure destabilizer, profoundly increased the melting temperature as well as viscosity of the gel, whereas NaCl, which is a protein structure stabilizer, decreased the gel viscosity but increased the melting temperature. However, the ΔH° of gelation was unaffected by the type of the salts used and exhibited a value of about 1 kcal/mol. On the basis of the results, we invoke that the major forces involved in the gelation of soy protein is hydrogen bonding and van der Waals interactions; the contribution of hydrophobic and electrostatic interaction is negligible. AA
- 922 CHERYAN (M) and DEESLIE (WD). Soy protein hydrolysis in membrane reactors. *J. Am. Oil Chem. Soc.* 60(6); 1983; 1112-5
- 923 SUNG (HY), CHEN (H-J), LIU (T-Y) and SU (J-C). Improvement of the functionality of soy protein by introduction of new thiol groups through a papain catalysed acylation. *J. Food Sci.* 48(3); 1983; 708-11
- 924 SUNG (H-Y), CHEN (H-J), LIU (T-Y) and SU (J-C). Improvement of the functionalities of soy protein isolate through chemical phosphorylation. *J. Food Sci.* 48(3); 1983; 716-21

A method of chemical phosphorylation was developed to modify soy protein so as to improve its functional properties. The reaction was carried out by incubating soy protein isolate and cyclic sodium trimetaphosphate in an aqueous solution at pH 11.5 and 35 C for about 3 hours. The reaction ensued were the phosphoesterification of serine residues and the phosphoramidation of lysine residues in soy protein. The phosphorylated soy protein isolate prepared therefrom exhibited much improved functional properties in terms of aqueous solubility, water-holding capacity, emulsifiability and whippability. The nutritive bioavailability of soy protein isolate was not impaired by phosphorylation. AA

SUNFLOWER

- 925 BAU (HM), MOHTADI-NIA (DJ), MEJEAN (L) and DEBRY (G). Preparation of colourless sunflower protein products: Effect of processing on physico-chemical and nutritional properties. *J. Am. Oil Chem. Soc.* 60(6); 1983; 1141-8

The processing treatments applied to sunflower seeds were as follows: (1) soaking dehulled seeds in dilute citric acid or sodium bisulphite solution, and washing the defatted meal with the respective solution; and (2) solvent extraction with hexane, or with a hexane/ethanol azeotrope. The effects of these treatments on nitrogen and lipid recovery, on the phenolic compounds present in sunflower seed, and on lysine availability have been reported. Citric acid, which is a chelating agent, proved to be as effective an antioxidant as sodium bisulphite; the products obtained by processing with citric acid were whiter in colour than those processed with sodium bisulphite. KMD

NUTS

- 926 SENTER (SD), HORVAT (RJ) and FORBUS (WR). Comparative GLC-MS analysis of phenolic acids of selected tree nuts. *J. Food Sci.* 48(3); 1983; 798-99, 824

Phenolic acids were extracted from the nutmeats and/or testae of pine nut, almond, filbert, American Chestnut, a hybrid American chestnut, Chinese chestnut, black walnut, butternut and shagbark hickory and analyzed as their methyl esters/trimethylsilyl derivatives by GLC-MS. Both qualitative and quantitative differences were observed among samples in the acids present with gallic acid being predominant except in pine nut, almond and filbert. Caffeic was the predominant acid in pine nut; protocatechuic acid was predominant in almond and filbert. Phenolic acids isolated and identified were *p*-hydroxybenzoic, *p*-hydroxyphenylacetic, vanillic, protocatechuic, syringic, gallic, caffeic and ferulic acids. AA

ALMOND

- 927 SAURA-CALIXTO (F), CANELLAS (J) and GARCIA-RASO (J). Contents of detergent-extracted dietary fibres and composition of hulls, shells, and teguments of almonds (*Prunus amygdalus*). *J. Agric. Food Chem.* 31(6); 1983; 1255-9
- 928 AXER (J). Use of almond butter in baked foods. *Cereal Foods World.* 29(3); 1984; 195-8

Almond came to be regarded as the raw material for nut butter for use in a variety of industrial applications. According to U.S. Government order in 1982 about 2% of almond crop has been made market development reserve pool. A variety of preparation namely almond butter short bread, cheese cookies, butter cookies, Granola bars, coffee cheese cake and crackers have been described in tabular form. Recommended almond butter formulations have been given. JVS

COCONUT

- 929 KRISHNAMURTHY (MN) and CHANDRASEKHARA (N). Polar lipids of coconut. *J. Food Sci. Technol. (India)* 20(5); 1983; 206-9

Total lipids of coconut were extracted using (i) chloroform-methanol (2:1 v/v), (ii) petroleum ether, (iii) by cold press and by (iv) Bligh and Dyer method and their physico-chemical characteristics (refractive index, saponification value, iodine value, Polenske value and P content) were determined. P was present in (i) and (ii) but absent in (iii) and (iv). Coconut

lipids comprised of 94.3% neutral, 5.5% glyco- and 0.2% phospholipids. The major components of phospholipids are phosphatidyl choline (34.6%), phosphatidyl ethanolamine (24.6%) and phosphatidyl inositol (19.0%). Both glyco- and phospholipids were rich in unsaturated fatty acids and had iodine values of 41.6 and 58.3 respectively. The presence of 0.4-0.5% linolenic acid in total lipids and 2-5% in glycolipids have been reported for the first time. It has been confirmed that the coconut contains polar lipids which are not extracted by cold pressing or by extraction with a non-polar solvent and polar lipids contain higher amounts of unsaturated fatty acids than the neutral lipids. AA

GROUNDNUT

- 930 HO (C-T), JIN (QZ), LEE (M-H) and CHANG (SS). Positive identification of new alkyloxazoles, alkylthiazoles, and piperidine in roasted peanut flavour. *J. Agric. Food Chem.* 31(6); 1983; 1384-6

Previous work provided evidence of the occurrence of new alkyloxazoles, alkylthiazoles, and 2-(2-aminoethyl)piperidine in the volatiles of freshly roasted peanuts. Synthesis and mass spectral data of these compounds are reported now. AA

PECAN

- 931 FORBUS (WR) Jr., SENTER (SD) and WILSON (RL). Physical properties of pecans relating to shelling efficiency. *J. Food Sci.* 48(3); 1983; 800-803

Inshell pecans of 21 cultivars and numbered trials selections were evaluated for selected physical properties and for their adaptability to be efficiently shelled by existing commercial technology. Processing efficiency was based on yield of unbroken half kernels during shelling. There were highly significant differences among varieties in both selected physical properties and shelling efficiency. Correlations between shelling efficiency and physical properties were determined. Results showed that percent total kernel, inshell length/diameter ratio and shell thickness were the physical properties that appeared to have the greatest effect on shelling efficiency. AA

TUBERS AND VEGETABLES

ONION

- 932 SINGH (KV) and DESMUKE (SK). Volatile constituents from the members of Fam. Liliaceae plants, and the spore germination of *Microsporium gypseum* complexes. *Riechstoff Aromen Kosmet.* 33(7-8); 1983; 166-7 (German)

The volatile constituents of *Allium sativum*, *A. cepa* (i.e. garlic and onion) and *Asparagus racemosus* were excellent inhibitors of spore germination of some of test fungi, especially *Microsporium gypseum*. The volatile substances from the remaining plant parts exhibited poor to good inhibition of spore germination against the test fungi. KMD

- 933 LANCASTER (JE) and KELLY (KE). Quantitative analysis of the S-alk(en)yl-L-cysteine sulphoxides in onion (*Allium cepa* L.). *J. Sci. Food Agric.* 34(11); 1983; 1229-35

The method described the separation, identification by gas chromatography - mass spectrometry and quantitation of ($\pm$) *trans*-s-1-propenyl-L-cysteine sulphoxide, ($\pm$) S-1-propyl-L-cysteine sulphoxide and ($\pm$) S-1-methyl-L-cysteine sulphoxide in onion tissue. KAR

LILY

- 934 TAKEDA (C), TAKEDA (Y) and HIZUKURI (S). Physicochemical properties of lily starch. *Cereal Chem.* 60(3); 1983; 212-6

BEET

- 935 ZAORSKA (H). Extraction of beetroot cossettes (slices) by percolation. *Ind. Aliment. Agric.* 100(3); 1983; 171-5 (French)

Extraction of beet cossettes by percolation was studied in order to determine the optimum limit of cossette exhaustion and the amount of sugar lost. At the correct conditions of extraction (viz. 76-78 C, 70 minutes) the purity of raw juice is one unit higher than the purity of the cell juice. The material balances relating to dry matter, sucrose, and non-sugars have been reported. The best yield of sugar is obtained by leaving 0.2-0.3% of sugar in the cossettes. KMD

- 936 COHEN (E) and SAGUY (I). Effect of water activity and moisture content on the stability of beet powder pigments. *J. Food Sci.* 48(3); 1983; 703-7

The effect of water activity ("dry" - 0.84) and moisture content on the stability of beet pigments (betanine and vulgaxanthine I) was investigated in beet powder stored at 35 C. Pigment deterioration followed a first order reaction. Water activity and moisture content had a pronounced exponential effect on pigment stability. A decrease of approximately one order of magnitude in pigment stability was observed when a_w was increased from 0.32 to 0.75. Storing the powder at a_w of 0.12 or below resulted in practically no deterioration of the pigments over a period of several months. Profound differences in pigment stability were attributed to sorption hysteresis and system composition. AA

CARROT

- 937 BAARDSETH (P) and SLINDE (E). Peroxidase, catalase and palmitoyl CoA hydrolase activity in blanched carrot cubes after storage at -20 C. *J. Sci. Food Agric.* 34(11); 1983; 1257-1262

- 938 BATT (C), SOLBERG (M) and CEPONIS (M). Effect of volatile components of carrot seed oil on growth and aflatoxin production by *Aspergillus parasiticus*. *J. Food Sci.* 48(3); 1983; 762-64, 768

The effect of the volatile fraction of carrot seed oil (VCSO) and its components on the growth and aflatoxin production by *Aspergillus parasiticus* was studied. Geraniol, citral and terpineol prevented growth and therefore aflatoxin production. VCSO inhibited growth and no aflatoxin was produced. Limonene and terpinene did not affect growth but inhibited aflatoxin production.

The addition of VCSO, limonene and terpinene decreased the rate of primary metabolism as demonstrated by the higher final pH of the medium. VCSO, limonene and terpinene reduced the growth rate, measured by the incorporation of (³H) amino acids into trichloroacetic acid (TCA) insoluble protein. The addition of VCSO at anytime up to 5 days reduced the aflatoxin accumulation at 7 days. AA

POTATO

- 939 MULLER (G). Investigations on the sulphitation of peeled potatoes. Part 2. The microflora of sodium bisulphite solutions in sulphitizing installations, and their influence on peeled potatoes. *Lebensmittelindustrie*. 30(7); 1983; 303-5 (German)

If the sulphitizing solution in the sulphiting drum is not renewed, but only topped up, or its concentration made up, then the solution may get enriched with micro-organisms, when a large quantity of peeled potatoes is passed through it. Large amounts of hydrogen sulphide forming bacteria and sulphite-reducing bacteria were found in such solutions. Their possibly negative effect on the sensory qualities of peeled potatoes have been discussed. The influence of sodium bisulphite on the microflora of sulphitizing solutions has been studied by means of model tests. KMD

- 940 LABUZA (TP) and BERGQUIST (S). Kinetics of oxidation of potato chips under constant temperature and sine wave temperature-conditions. *J. Food Sci.* 48(3); 1983; 712-5,721

Lipid oxidation in potato chips at 30, 37 and 45 C followed zero order kinetics as measured by peroxide value (PV). An Arrhenius plot of log k versus $(T^{\circ}\text{K})^{-1}$ showed slight underprediction at low temperatures. Data from constant conditions were used to predict the extent of this free radical reaction under a sine wave temperature fluctuation (25/45 C with a 24 hour period). Predictions of effective rate constant, temperature and extent were found to agree to within 3.5% of the actual results up to a PV of 7 where bimolecular oxidation occurred. The sine wave condition entered the bimolecular oxidation sooner than was observed under steady data for the same effective temperature. AA

CASSAVA

- 941 OHOCHUKU (NS) and BALLANTINE (JA). Fermented cassava: Odour active components. *J. Agric. Food Chem.* 31(6); 1983; 1386-7

In Nigeria, tubers are processed to garri and also fermented in cold water and sieved to give a fermented mass used to prepare cassava fufu. The fermentation of cassava tubers in cold water usually imparts an objectionable odour to the fermented mass and the cooked fufu. The compounds responsible for this odour have been isolated from the acidic fraction of fermentation liquor and analyzed by combined gas chromatography and mass spectrometry. The acids identified are butanoic acid, propanoic acid, and acetic acid, butanoic acid being responsible for the objectionable odour. AA

BAMBOO SHOOT

- 942 KOZUKUE (E), KOZUKUE (N) and KUROSAKI (T). Organic acid, sugar and amino acid composition of bamboo shoots. *J. Food Sci.* 48(3); 1983; 935-8

The major organic acid in bamboo shoots (*Phyllostachys pubescens*) was oxalic, ranging from 462 (top) to 157 mg (base) per 100 g fresh weight. Citric was rich in the upper half, while malic was rich in the lower 3/4 ths. Fructose, glucose and sucrose were contained with approximately equal amounts in the top quarter section, the former two sugars were also abundant in the lower half. Tyrosine was the most abundant component in the free amino acid. GC-MS determination revealed that tyrosine was the major component of white clumpy substances produced after blanching, and its content comprised 89% of the total material. In addition, the material contained 5.5% starch, 4.9% moisture, and 0.6% minerals. AA

VEGETABLES

- 943 AUNG (LH), HUBBARD (JB) and FLICK (GJ) Jr. Mineral composition of vegetable crops fertilized with fish-soluble nutrients. *J. Agric. Food Chem.* 31(6); 1983; 1259-62

Pea, tomato, radish, and lettuce crops were analyzed for 20 elements by atomic absorption spectrometry. Elemental contents of vegetables that had been fertilized with different rates of fish-soluble nutrients were compared to those fertilized with standard Hoagland nutrient solution. The mineral contents of the edible organs were altered by fertilization with fish-soluble nutrients. Pea seeds and tomato fruits responded favourably, with no heavy metal accumulation. Lettuce leaves and radish storage roots showed a greater accumulation of certain mineral elements but no excessive heavy metal accumulation. AA

- 944 APPAIAH (KM), NAG (UC), KAPUR (OP) and NAGARAJA (KV). Colorimetric determination of carbaryl and its residue in vegetables. *J. Food Sci. Technol. (India)* 20(5); 1983; 252-3

A method has been developed for the determination of carbaryl (1-naphthyl-N-methyl carbamate) in formulations and vegetables. Carbaryl on hydrolysis with methanolic KOH gives 1-naphthol which when coupled with diazotised 4:4-diaminodiphenyl sulphone has an absorption maxima at 540 nm. Beer's law is obeyed in the range of 0.25-5.0 µg/ml. The method is sensitive and can detect as low as 0.5 ppm of carbaryl in cabbage, okra and beans. AA

- 945 FLEMING (HP), McFEETERS (RF), THOMPSON (RL) and SANDERS (DC). Storage stability of vegetables fermented with pH control. *J. Food Sci.* 48(3); 1983; 975-81

Vegetables fermented by *Lactobacillus plantarum* with pH control were microbiologically stable during 12-months; storage in hermetically sealed jars at ca. 24 C provided all fermentable sugars were removed during fermentation, and the products were stored at pH 3.8 or below. Fermented green beans, cucumbers, red and green bell peppers, and green tomatoes were thus rendered microbiologically stable. Fermented red beets and carrots, which contained residual sucrose, underwent secondary fermentation. Calculated carbon recoveries of the fermented vegetables ranged from 74-146%. AA

- 946 FLEMING (HP), McFEETERS (RF) and THOMPSON (RL). Test for susceptibility of fermented vegetables to secondary fermentations. *J. Food Sci.* 48(3); 1983; 482-3

A simple test is described for determining completeness of vegetable fermentations. Brines of fermented vegetables are adjusted to pH 4.5, inoculated with selected fermentative yeasts in culture tubes, overlaid with petrolatum, and incubated. Fermentation is indicated by separation of petrolatum from the brine due to gas production by the yeasts. Nutrient supplementation of fermented vegetable brines required to support gas production by yeasts and growth of lactic acid bacteria was determined. Absence of fermentable carbohydrate was the indicated reason for brines not being susceptible to secondary fermentation. AA

ALFALFA

- 947 ELAKOVICH (SD) and HAMPTON (JM). Analysis of coumestrol, a phytoestrogen, in alfalfa tablets sold for human consumption. *J. Agric. Food Chem.* 32(1); 1984; 173-5

Three locally available brands of commercial alfalfa tablets were analyzed for their coumestrol content by high-performance liquid chromatography and were found to contain from 20 to 190 ppm of this phytoestrogen. The recommended dosage of the alfalfa tablets that contain 190 ppm of coumestrol would provide greater than 1.1 mg/day coumestrol. These findings raise the possibility that those who take some brands of alfalfa tablets as a dietary supplement may be unwittingly receiving an unwelcome amount of this estrogenic hormone. AA

LETTUCE

- 948 WOLNIK (KA), FRICKE (FL), CAPAR (SG), BRAUDE (GL), MEYER (MW), SATZGER (RD) and BONNIN (E). Elements in major raw agricultural crops in the United States. I. Cadmium and lead in lettuce, peanuts, potatoes, soyabeans, sweet corn and wheat. *J. Agric. Food Chem.* 31(6); 1983; 1240-44

Six raw agricultural crops (lettuce, peanuts, potatoes, soyabeans, sweet corn, and wheat) were collected from major U.S. growing areas uncontaminated by human activities other than normal agricultural practices and analyzed for Cd and Pb by using differential pulse anodic stripping voltammetry. Handling, preparation, and analysis of the 1645 samples were performed under carefully controlled conditions. Mean concentrations of Pb and Cd ($\mu\text{g/g}$ wet weight) were, for lettuce, 0.013 and 0.026, for peanuts, 0.10 and 0.078, for potatoes, 0.009 and 0.031 for soyabeans, 0.042 and 0.059, for sweet corn, 0.0033 and 0.0031, and, for wheat, 0.037 and 0.043, respectively. Most of these values, considered to be background, are much lower than those reported previously. AA

- 949 WOLNIK (KA), FRICKE (FL), CAPAR (SG), BRAUDE (GL), MEYER (MW), SATZGER (RD) and KUENNEN (WK). Elements in major raw agricultural crops in the United States. 2. Other elements in lettuce, peanuts, potatoes, soyabeans, sweet corn, and wheat. *J. Agric. Food Chem.* 31(6); 1983; 1244-9

Six raw agricultural crops (lettuce, peanuts, potatoes, soyabeans, sweet corn, and wheat) were collected from fields in major U.S. growing areas and were analyzed for Ca, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, P, Se, and Zn. Statistical frequency distributions of some of the major elements were normal. AA

WATERCRESS

- 950 SPENCE (R-MM) and TUCKNOTT (OG). The examination of the headspace volatiles of water cross. *J. Sci. Food Agric.* 34(7); 1983; 768-72
- Several compounds which contribute to the aroma of watercress were identified by GC, and MS analysis and odour evaluation of the gas chromatographic effluent. KAR

CAULIFLOWER

- 951 LEE (CY), PENNESI (AP) and DICKSON (MH). Characterization of the cauliflower peroxidase isoenzyme. *J. Agric. Food Chem.* 32(1); 1984; 18-21
- Cauliflower peroxidases were separated into three isoenzymes by using hydrophobic chromatography. Some characters of the major isoenzyme, which consists of over 94% of the total peroxidase activity, were studied. Optimal pH and temperature with guaiacol as a substrate were found to be pH 6.5 and 40 C. Kinetic studies indicated an apparent K_m of 3.1 mM for guaiacol at an optimal hydrogen peroxide concentration and a K_m of 8.7 mM for hydrogen peroxide at an optimal guaiacol concentration. The heat inactivation rate followed first-order kinetics with the activation energy, $E_a = 46.4$ kcal/mol. As this indicated, the isoenzyme preparation was very heat labile; at 50 C, it took only 15 minutes to reduce its activity by 98%. AA

TOMATO

- 952 BASEL (RM) and GOULD (WA). An investigation of some important storage parameters in acidified bulk storage of tomatoes. *J. Food Sci.* 48(3); 1983; 932-4
- Acidified bulk storage of tomatoes at a pH of approximately 1.3 was used to store whole tomatoes without spoilage for up to 4 months. Storage treatments of time and temperature lead to concurrent off flavour and brown colour development which was presumed to be at least partially due to container oxygen permeability problems. Best quality in this study was found after storage at lowered temperatures. When unpeeled tomatoes were stored, they softened during storage and did not remain whole upon subsequent peeling. Heat peeled whole tomatoes stored in tomato juice gave the best storage quality of any treatment combinations used. The major problem experienced with this storage method was nonmicrobial chemical deterioration of product quality after storage. AA
- 953 BASEL (RM). Identification of tomato catsup comminution process using sucrose velocity gradient centrifugation. *J. Food Sci.* 48(3); 1983; 984-5
- Sucrose gradients 5-60% were used to determine the method of comminution used for preparing catsup. Unmilled samples showed a very broad centrifugation pattern while milling or low-seed homogenization showed a narrower centrifugation pattern. High pressure (210 kg/sq.cm.) homogenization caused discrete bands upon centrifugation. Results of standard samples were compared to catsup produced by midwest processors. AA

FRUITS

- 954 HOLLOWAY (WD). Composition of fruit, vegetable and cereal dietary fibre. *J. Sci. Food Agric.* 34(11); 1983; 1236-40

A sequential extraction of freeze-dried bean, cabbage, lettuce, tomato, peach, pumpkin, sweet potato, onion, pear, wheat bran, lucerne, clover and ryegrass with water, oxalate and sodium hydroxide (before and after delignification) was carried out. The fruits and vegetables gave a higher yield of water and oxalate soluble polymers than wheat bran. The water and oxalate soluble extracts were composed predominantly of arabinose, galactose and uronic acid, whereas the sodiumhydroxide extracts contained mainly arabinose and xylose. AA

- 955 ANDREOTTI (R), TOMASICCHIO (M) and MACCHIAVELLI (L). Partial dehydration of fruits by osmosis. *Ind. Conserve.* 58(2); 1983; 90-95 (Italian)

Considering dehydration rate and the quality of the finished products, glucose and isomerized glucose-fructose syrups proved to be the most suitable dehydrating media, by osmosis for pears, cherries and apricots. 43 C was found to be satisfactory for osmotic dehydration of pears and cherries. Dehydrofreezing was found to be a better technique than osmosis for dehydration of fruits. AA

- 956 MOY (JH), KANNESHIRO (KY), OHTA (AT) and NAGAI (N). Radiation disinfection of California stone fruits infested by medfly-effectiveness and fruit quality. *J. Food Sci.* 48(3); 1983; 928-31, 934

STRAWBERRY

- 957 GHERARDI (S), BAZZARINI (R), BIGLIARDI (D) and TRIFIRO (A). Analytical characteristics of strawberries of different origin. *Ind. Conserve.* 58(2); 1983; 101-4 (Italian)

Analyses were performed on 19 samples of strawberries of different origin (16 from various Italian regions, 2 from Poland and 1 from Yugoslavia). The contents of sugars (glucose and fructose), sorbitol and organic acids (L-malic and citric acids), as well as their ratios, were found to be the most significant parameters for the quality of a strawberry product. AA

- 958 JOHNSON (JL), DZENDOLET (E) and CLYDESDALE (FM). Psychophysical relationship between sweetness and redness in strawberry-flavoured drinks. *J. Food Prot.* 46(1); 1983; 21-5, 28

PINEAPPLE

- 959 KARG (JE). The exotic flavour - pineapple : History, formulation, future. *Riechstoffs. Aromen Kosmet.* 33(7-8); 1983; 163-5 (German)

The older literature on the production of pineapple aroma has been reviewed, and the essential constituents indicated. Methyl 3-methylmercaptopropionate in combination with 2,5-dimethyl-4-hydroxy-2,3-dihydro-3-furanone may be called the characteristic aroma component of this species. Lactones have well-rounded flavour properties. Typical pineapple-aroma-producing substances are listed in a table; but their compliance with legal requirements has not been dealt with here. KMD

- 960 BERGER (RG), DRAWERT (F) and NITZ (S). Sesquiterpene hydrocarbons in pineapple fruit. *J. Agric. Food Chem.* 31(6); 1983; 1237-9

The volatile constituents of pineapple fruit have been isolated under enzyme inhibition, enriched by liquid-liquid extraction, and fractionated on silica gel. Analysis of the nonpolar fraction by gas chromatography and coupled GC-MS showed at least 20 sesquiterpene hydrocarbons to be present. α -Copaene, β -ylangene, α -patchoulene, γ -gurjunene, germacrene D, α -muurolene, and δ -cadinene were identified via authentic samples and/or published data. One of the minor compounds of the fraction seems to be responsible for the fragrant odour (remnescent of fresh-cut pineapple). AA

GRAPE

- 961 MAY (P), CLINGELEFFER (PR) and SIMMONS (ID). Effect of varying the method of applying alkaline emulsion on the drying of sultana grapes. *J. Sci. Food Agric.* 34(11); 1983; 1215-28

Sultana berries were treated with alkaline oil-in-water emulsion by partial or total immersion, spotting or spraying. Approximately 37 l of emulsion adhere to the berry during immersion, but about 85% of this accumulates as run off droplets. Drying accelerates as berries receive more spots of emulsion. Approximately 9 μ l of emulsion placed by spotting a part-immersion give raisins of similar quality to that of raisins dried after total immersion, despite slower drying rates during the first 36-48 hour of dehydration. Any further reduction in the amount of emulsion leads to slower drying and darker raisins. KAR

- 962 MATTICK (LR). A method for the extraction of grape berries used in total acid, potassium, and individual acid analysis. *Am. J. Enol. Vitic.* 34(1); 1983; 49

Describes a laboratory procedure based on the reduction of variability between the analysis and results in the total acid, potassium and tartrate values, which is more representative to the actual berry concentration. The procedure enables use of frozen berries, which is an advantage over the conventional method. BSN

- 963 ROBERTSON (GL). Salicyclic acid in grapes. *Am. J. Enol. Vitic.* 34(1); 1983; 42-3

The highly sensitive spectrofluorometric technique enabled detection of 0.04 mg/kg salicyclic acid in the crushed juice, while press residue after crushing, heating and pressing had 0.07 mg/kg. The salicyclic acid content of crushed, fermented and pressed residue was however, 0.08 mg/kg salicyclic acid. BSN

- 964 NELSON (KE). Effects of in package sulphur dioxide generators, package liners, and temperature on decay and desiccation of table grapes. *Am. J. Enol. Vitic.* 34(1); 1983; 10-16

CITRUS

- 965 PATEL (JD), VENKATARAMU (K) and SUBBA RAO (MS). Antifungal activity of orange and lime oils. *J. Food Sci. Technol. (India)* 20(5); 1983; 250-52

Terpene containing and terpeneless orange oil and lime oil were used at concentration of 50 to 750 mg % to study their inhibitory effect on

Aspergillus sp., *Rhizopus* sp. and *Fusarium* sp. isolated from vegetables. Terpene formate, terpene acetate and limonine oxide were also tried at concentration of 50-400 mg % on these fungal cultures. Terpene fraction of orange oil at 250 mg %, non-terpene fraction of lime oil at 200 mg % terpenyl formate and limonine oxide at 300 mg % concentration were inhibitory to the spores of all three fungi. Terpenyl acetate at 300 mg % level was inhibitory to *Rhizopus* and *Fusarium* but, showed little effect on *Aspergillus*. KAR

GRAPEFRUIT

- 966 HATTON (TT) and CUBBEDGE (RH). Preferred temperature for prestorage conditioning of 'Marsh' grapefruit to prevent chilling injury at low temperatures. *Hortscience*. 18(5); 1983; 721-2

Prestorage conditioning of grapefruit (*Citrus paradisi* Macf.) at 16 C was better than at 21 and 27C in minimizing chilling injury (CI) to grapefruit stored at 1 C. Fruit preconditioned for 7 days at 16C did not develop CI during 21 days at 1C. Fruit stored for 28 days at 1C without preconditioning sustained 23% CI. Fruit stored for 21 days at 1C after 7 days of preconditioning at either 21 C or 27 C sustained 11% CI. AA

ORANGE

- 967 CRANDALL (PG), KESTERSON (JW) and DENNIS (S). Storage stability of carotenoids in orange oil. *J. Food Sci.* 48(3); 1983; 924-7

Citrus essential oils are used as flavouring agents in foods and beverages. Recently a premium price was paid for oils with a high carotenoid content because they were also used as natural colouring agents. Commercially manufactured samples of 'Pineapple' oils were concentrated 5, 10, and 25-fold, stored for 12 months at -18, 4, 26 and 32 C and sampled periodically. The carotenoid content was measured spectrophotometrically with β -carotene as a standard. From an initial value of 7.2 mg of β -carotene/100 g of oil, it decreased 6.6, 18.4, and 24.6% upon concentrating 5, 10, and 25-fold, respectively. The 25-fold sample lost 6% of its β -carotene at -18 C and 90% at 32 C during 12 months of storage. There was a highly significant fit of the time, temperature and concentration data to a second order model. AA

- 968 RIEDEL (HR). Pralines made with candied orange or grape fruit peel. *Confect. Prod.* 49(10); 1983; 526-8

Reports recipes and method of preparation, based on use of candied orange or grapefruit peel, of Pralines (relief with orange-nut filling, grenade splinters (sharpnel) orange chocolate, orange or grapefruit flavoured nut clusters, soft crokant flavoured with orange, orange crokant, crokant with peanuts, Arancine crokant, orange truffle filling, refreshing discs of grapefruit or orange, dragees orange peel (chocolate dragees), orange fondant, orange confection, white French nougat, orange peels in curacao BSN

MANDARIN

- 969 ORTIZ MARCIDE (JM), TADEO LLUCH (JL), DIAZ LLANOS (FJ) and ESTELLES ADAM (A). Examination of the essential oils from the leaves of the mandarin elementive group. *Fruits*. 38(2); 1983; 125-31 (French)

The essential oil from the leaves of twelve cultivars of elementive mandarins was analyzed. The major constituents of the oil from the cultivar Clementina appear to be α -pinene (19-45%) linolool (16-27%) and citronellol (approx. 20%), which are accompanied by smaller quantities of citronella, limonene, and β -myrcene. Most of the cultivars studied appear to form a homogenous group; only the cultivar "Clemenvilla" appears to be somewhat further away, perhaps because of its probably hybrid origin. KMD

MANGO

- 970 KAPUR (KL). Volatile components of Dashehari mango. *J. Food Sci. Technol.* (India) 20(5); 1983; 242-43

The steam distillate of Dashehari mango was found to be waxy in nature. Gas liquid chromatography studies indicate that the aroma of Dashehari mango is a mixture of 30-40 components, the possibility of the existence of Osimene, *cis*- and *trans* allocimene, myrcene, and hexa- and hepta-lactones has been indicated. KAR

AVOCADO

- 971 AVILAN (L).and CIURANA (J). The avocado (*Persea americana* Mill) in Venezuela. *Fruits*. 38(3); 1983; 183-8 (French)

APPLE

- 972 NAKAYAMA (M) and OTA (Y). Physiological function of ethylene and low pressure storage of apple. *JARQ*. 17(1); 1983; 30-33

In apple, when stored under controlled atmosphere, maximum ethylene production was observed about 30 C which decreased with decreasing temperature. Ethylene production was also reduced by decreased O₂ concentration, but it was inhibited by higher concentration of CO₂. At the air pressure lower than 95 mm Hg ethylene production was markedly inhibited. Apples were stored at 160 mm Hg, 40 mm Hg, and 80 mm Hg at 5 C. During storage under low pressure, the fruits were characterized by high acidity which decreased during storage, but not at 40 and 80 mm Hg where browning of core was observed in later stages of 5 months storage. KAR

- 973 SINGH (RK), LUND (DB) and BUELOW (FH). Storage stability of intermediate moisture apples: Kinetics of quality change. *J. Food Sci.* 48(3); 1983; 939-44

PAPAYA

- 974 YANG (PY), MOY (JH) AND WEITZENHOFF (MH). A hybrid solar-biogas system for food drying: Biogas generation from processed papaya wastes. *J. Food Sci.* 48(3); 1983; 905-8

SUGAR, STARCH AND CONFECTIONERY

- 975 VALENTOVA (O), MAREK (M), ALBRECHTOVA (I), ALBRECHT (J) and KAS (J). Enzymic determination of glucose in foodstuffs. *J. Sci. Food Agric* 34(7); 1983; 748-54

Determination of D-glucose in foodstuffs was performed either with free glucose oxidase or with glucose oxidase bound to a glycidylmethacrylate polymer. Glucose oxidase immobilised on a nylon net was used for preparation of an enzyme electrode specific for glucose. Results of analysis obtained by the enzymic methods were compared with the determination of glucose by a common Steinhoff method and ion exchange chromatography. AA

- 976 IKEDA (K) and KUSANO (T). *In vitro* inhibition of digestive enzymes by indigestible polysaccharides. *Cereal Chem.* 60(4); 1983; 260-63

HONEY

- 977 DAHARU (PA) and SPORUS (P). Evaluation of analytical methods for the determination of residues of bee repellent phenol in honey and beeswax. *J. Agric. Food Chem.* 32(1); 1984; 108-111

Reverse phase HPLC was most suitable for phenol analysis, using 4-chlorophenol as internal standard. JVS

- 978 BARRY (P) and MacEARHERN (GM). Reverse phase liquid chromatographic determination of sulphathiazole residues in honey. *J. Assoc. Off. Anal. Chem.* 66(1); 1983; 4-7

The average recovery of sulphathiazole residues in honey, by the method described in this paper, was 78% at the 0.1 ppm spiking level, and 68% at the 1 ppm level. The minimum detectable amount was 0.06 ppm, based on a spiked sample extract. KMD

- 979 MAGA (JA). Honey flavour. *Food Sci. + Technol.* 16(2); 1983; 65-8

The volatile compounds that have been identified in various honeys are summarized. In addition, the role of various non-volatile compounds such as carbohydrates, free amino acids and acids in complimenting honey flavour is discussed. The influence of certain honeybee diseases on resulting honey flavour and the utilization of imitation honey flavour has been discussed. AA

CONFECTIONERY

- 980 ANON. In-place cleaning of continuous confectionery plant. *Confect. Prod.* 49(3); 1983; 170

- 981 ANON. Tailor made ingredients from dairy crest. *Confect. Prod.* 49(2); 1983; 118

FONDANT

- 982 SWEETMAKER. Making the best use of fondant. *Confect. Prod.* 49(5); 1983; 273-4
- 983 SWEETMAKER. Fondant - Much more than a sweetmeat. *Confect. Prod.* 49(4); 1983; 227-8

FUDGE

- 984 SWEETMAKER. Fudge remains a favourite with all age groups. *Confect. Prod.* 49(3); 1983; 145-6

GUM/JELLY/PASTILLES

- 985 SWEETMAKER. Gums - jellies - pastilles. Part 1. Preparation of high quality gelatine jellies. *Confect. Prod.* 49(6); 1983; 331-2
- 986 SWEETMAKER. Gums - jellies - pastilles : Part V. Tender agar jellies; mixing with gelatine, starch and fruit pulp. *Confect. Prod.* 49(10); 1983; 522-3

The ingredients and process for preparation of agar - jellies has been described. BSN

CHOCOLATE

- 987 ANON. Chocolate centre production by starch moulding and other means. *Confect. Prod.* 49(5); 1983; 254
- 988 ANON. Chocolate enrobing of biscuits. *Confect. Prod.* 49(2); 1983; 115-6
- 989 VENKATESH (KVL), MAHADEVIAH (B), DHANRAJ (S), MAHADEVIAH (M), ANANTHAKRISHNA (SM), ANANDASWAMY (B), GOVINDARAJAN (VS) and SEN (DP). Studies on packaging and storage of Sohan papri. *J. Food Sci. Technol. (India)* 20(5); 1983; 209-13

Sohan papri, an Indian sweetmeat based on Besan (Chickpea flour) has a short shelf-life of about 12 days. In order to extend the shelf-life, Sohan papri was treated with BHA and packed separately in flexible pouches (Aluminium foil, HDPE and Poly/LDPE) and rigid containers (Dingley and Tagger top) and stored at 27 C and 65% RH upto a period of 110 and 225 days respectively. The sorption-isotherm studies revealed that the product has a permissible moisture pick up of 1.7% with critical moisture content of 3% and ERH of 30%. Chemical parameters such as FFA, PV, Kries test, TBA and colour were periodically estimated. Sensory evaluation results indicated that the product could be stored well for 30 days in poly/LDPE, 110 days in HDPE and aluminium foil, and 225 days in rigid containers. AA

PIE

- 990 TODD (ECD), JARVIS (GA), WEISS (KF), RIEDEL (GW) and CHARBONNEAU (S). Microbiological quality of frozen cream-type pies sold in Canada. *J. Food Prot.* 46(1); 1983; 34-40

BAKERY PRODUCTS

- 991 SAUSSELE (H) Jr., ZIEGLER (HF) and WEICKMAN (JH). High fructose corn syrups for bakery applications. *Baker's Dig.* 57(4); 1983; 26-8
Properties of high fructose corn syrups and its applications in bread, cake, cookies, and sweet doughs have been discussed. KAR
- 992 HOSENEY (RC), LINEBACK (DR) and SEIB (PA). Role of starch in baked foods. *Baker's Dig.* 57(4); 1983; 65-71
- 993 REIMAN (HM). Chemical leavening systems. *Baker's Dig.* 57(4); 1983; 37-40
Principles of leavening; types of leavening agents; neutralizing value and pH of the leavening agent, refrigerated and frozen doughs and reducing proof time are the aspects covered. KAR

BREAD

- 994 TSEN (CC), WEBER (JL) and EYESTONE (W). Evaluation of distillers dried grain flour as a bread ingredients. *Cereal Chem.* 60(4); 1983; 295-7
- 995 MARSTON (PE) and WANNAN (TL). Bread baking - the transformation from dough to bread. *Baker's Dig.* 57(4); 1983; 59-64
- 996 SMERAK (L). Effective commercial no-time dough processing for bread and rolls. *Baker's Dig.* 57(4); 1983; 20-25
- 997 BREYER (LM) and WALKER (CE). Comparative effects of various sucrose-fatty acid esters upon bread and cookies. *J. Food Sci.* 48(3); 1983; 955-8, 987
Standardized bread and cookies were baked to test the effects of sucrose fatty-acid esters, ranging in HLB (hydrophil-lipophil-balance) from 1 to 15. Bread volume and tenderness and cookie spread were determined. Interactions between shortening and the esters were tested in bread, and between nonwheat flours and the esters in both bread and cookies. Bread volume was restored when up to 20% sorghum, millet and corn flours were added. Bread tenderness over a five-day period was also improved by use of the esters. The most practical emulsifier use levels ranged from 0.5-1.0% depending upon emulsifier HLB. AA
- 998 OSBORNE (BG). Measurement of levels of bread improvers in concentrates by means of near infrared reflectance spectroscopy. *J. Sci. Food Agric.* 34(11); 1983; 1297-301
The simultaneous analysis of ascorbic acid, azodicarbonamide and L-cysteine in bread improver mix concentrates at levels of 0-10% in a starch diluent has been achieved. The use of near infrared reflectance spectroscopy enabled the measurements to be obtained in less than one minutes with accuracies of about $\pm 1\%$ at the 95% confidence interval. AA

- 999 PISESOOKBUNTERNG (W) and D'APPOLONIA (L). Bread staling studies. I. Effect of surfactants on moisture migration from crumb to crust and firmness values of bread crumb. *Cereal Chem.* 60(4); 1983; 298-300

Bread containing surfactant showed greater ambient of migration from crumb to crust as compared to control bread. Surface tension of water in bread crumb was not reduced by addition of 0.5% of surfactant. The adsorption of surfactant to starch surface and the complex formation between starch and surfactant led to prevention of starch from taking water released from gluten during bread ageing. Firmness of fresh bread was not adversely affected by surfactant, but it showed down firming rate of bread crumb during storage sodium. Stearoyl lactylate showed lower firmness in aged bread suggesting thereby, that it had the strongest binding ability with starch among the surfactants investigated. BSN

- 1000 PISESOOKBUNTERNG (W), D'APPOLONIA (BL) and KULP (K). Bread staling studies. II. The role of refreshing. *Cereal Chem.* 60(4); 1983; 301-5

Breads refreshed by heating at 90 C for 45 minutes and on storage at 2 C for 2 days regained the original firmness. Surfactants (sodium stearoyl lactylate and Atmul 500) aided restoration of original freshness in bread. Firmness data obtained have been supported by organoleptic scores, X-ray diffraction patterns and soluble starch data. BSN

PIZZA

- 1001 RANHOTRA (GS), VETTER (JL), GELROTH (JA) and NOVAK (FA). Sodium in commercially produced frozen pizzas. *Cereal Chem.* 60(4); 1983; 325-6

BISCUIT

- 1002 WATSON (B). Biscuits that deserve a healthy image. *Cereal Foods World.* 29(3); 1984; 201-2

More than 1000 biscuit lines are produced in Great Britain. After Netherlands, Great Britain has the highest consumption of biscuits in the world, namely 7½ million packets a day or 8½ oz. per person per day. In 1982, Britain exported 130 million dollar worth of biscuits. The biscuits manufactured by different organisations have been discussed. JVS

CRACKER

- 1003 N'JIFORO (DS). Seasonings for snack crackers. *Cereal Foods World.* 29(3); 1984; 187-8

The cracker industry was the seasoning by way of internal application, topical application and also as slurry. The rate of applications and ingredients of seasoning are described. JVS

MILK AND DAIRY PRODUCTS

- 1004 WRIGHT (CT) and KLAENHAMMER (TR). Survival of *Lactobacillus bulgaricus* during freezing and freeze-drying after growth in the presence of calcium. *J. Food Sci.* 48(3); 1983; 773-7

- 005 HEATH (HB). Flavourings for dairy products. *Food Flavour. Ingrid. Packag. Process.* 5(12); 1983; 31,33,34

The choice and application of food flavourings suitable for dairy products (fresh chilled milk, butter, cheese, fermented product like yoghurt, waste by products like powdered skim milk, whey powder, ice-cream, milk based desserts and concentrated milk products) has been discussed. BSN

- 006 GRIEGER (U) and PEHSLIES (H). Rational determination of efficiency in the dairy industry. *Lebensmittel-industrie*. 30(7); 1983; 306-8 (German)

The various indices used to define efficiency in the dairy industry have been subjected to a regression analysis. The following parameters may serve as secondary indices: (a) for productivity: output - capital ratio, labour productivity and material intensity; (b) for profitability: rate of return on capital employed, rate of profit, and labour profitability; (c) as a mixed index: the cost ratio; (d) for relation to central funds: the profit-connected subsidies and payments. For complete analyses at a given point of time, it is advisable to calculate the proportional factors of the above parameters. KMD

MILK

- 1007 WHEELER (SM), FLEET (GH) and ASHLEY (RJ). Effect of processing upon concentration and distribution of natural and Iodophor-derived iodine in milk. *J. Dairy Sci.* 66(2); 1983; 187-95

- 1008 BRUHN (JC), FRANKE (AA), BUSHNELL (RB), WEISHEIT (H), HUTTON (GH) and GURTLE (GC). Sources and content of iodine in California milk and dairy products. *J. Food Prot.* 46(1); 1983; 41-6

- 1009 de MAN (L) and de MAN (JM). Trans - Fatty acids in milk. *J. Am. Oil. Chem. Soc.* 60(6); 1983; 1095-98

- 1010 PIRISINO (JF). High performance liquid chromatographic determination of lactose, glucose, and galactose in lactose - reduced milk. *J. Food Sci.* 48(3); 1983; 742-44, 754

- 1011 GOLDSMITH (SJ), EITENMILLER (RR), TOLEDO (RT) and BARNHART (HM). Effect of processing and storage on the water-soluble vitamin content of human milk. *J. Food Sci.* 48(3); 1983; 994-5, 997

Effects of four heat treatments (62.5 C, 30 minutes; 72 C, 15 seconds; 88 C, 5 seconds; and 100 C, 5 minutes) and frozen storage (-20 C, 4 weeks) on water-soluble vitamin content of composite samples of mature human milk were determined. No changes in riboflavin, biotin, and total pantothenic acid content were observed after any of the treatments. Heating at 100 C for 5 minutes decreased thiamin, vitamin B₁₂, and vitamin C contents. Vitamin B₆ content was reduced by heating at 88 C and 100 C. Free folate was not affected by heating while total folate concentration was decreased similarly by all heat treatments. During frozen storage at -20 C, niacin and free pantothenic acid concentrations were reduced; riboflavin, vitamin B₆, biotin, total pantothenic acid, vitamin C, and vitamin B₁₂ were unaffected; while measurable thiamin and free folate concentrations increased. Overall, the two lower temperature treatments were less detrimental to the water-soluble vitamins in human milk. AA

- 1012 KIRST (E) and UEBEL (I). Investigations on estimation of the size of milk-fat globules. Part 1. Microscopic investigations. *Lebensmittelindustrie*. 30(7); 1983; 309-11 (German)

The structure of milk fat and the methods used to determine the size of milk-fat globules have been reviewed. Further, the effects on formation of a layer of cream on top of the milk, degree of homogenization, and on the average size and distribution of milk fat globules in raw milk, milk ready for drinking, and milk homogenized with a laboratory blender have been investigated. Finally, the test methods employed for the above purposes have been described. KMD

- 1013 MISTRY (VV) and KOSIKOWSKI (FV). Use of time-temperature indicators as quality control devices for market milk. *J. Food Prot.* 46(1); 1983; 52-7

- 1014 STONE (JB), MYHR (AN) and DAVIE (I). Effect of low-temperature cleaning of milking equipment on the microbiological quality of raw milk. *J. Food Prot.* 46(1); 1983; 58-60

- 1015 POSSOMPES (B), CUQ (JL), GUENOUN (D) and BESANEON (P). Use of cysteine as a reducing agent during alkali treatment of proteins. Biochemical and nutritional effects. *Food Chem.* 11(1); 1983; 15-26

Alkali treatment of casein, in the presence of 0.1N or 0.2N sodium hydroxide, at 80 C for 1 hour, leads to a loss of amino acids and to the formation of lysinoalanine; in the rat, growth, protein efficiency ratio and nitrogen digestibility are decreased. The addition of cysteine (6.1 g/100 g casein) as a reducing agent during the alkali treatment of casein avoids the formation of lysinoalanine and the harmful biological effects of alkali treatment. Sulphur amino acid (L-cysteine or DL-methionine) supplementation of treated casein, added after the alkali treatment, is without beneficial effect. AA

- 1016 MATHEIS (G), PENNER (MH), FEENEY (RE) and WHITAKER (JR). Phosphorylation of casein and lysozyme by phosphorus oxychloride. *J. Agric. Food Chem.* 31(2); 1983; 379-87

- 1017 RAWSON (N) and MAHONEY (RR). Effect of processing and storage on the protein quality of spray-dried lactose-hydrolysed milk powder. *Food Sci. + Technol.* 16(6); 1983; 313-6

Lactose-hydrolysed milk was either freeze-dried or spray-dried and then stored for 4 months at 30 C at different water activities (a_w) in order to study changes in protein quality. Drying the milk caused only minor losses in reactive lysine (10-20%); much greater losses occurred during storage (30-55%) except when the a_w was 0.11. Dye-binding values using Remazol Blue R tended to underestimate losses in reactive lysine. Net protein ratio (NPR) values after storage were more accurately predicted by total lysine values rather than by reactive lysine values. The reactive lysine content and NPR values were essentially the same for both powders after storage for 4 months at 0.2 a_w , thus use of the cheaper spray-dried powder seems justified. AA

CURD

- 1018 KULKARNI (S) and VISHWESHWARIAH (L). A new method for curd tension measurement. *J. Food Sci. Technol.* (India) 20(5); 1983; 214-6

A modified method taking into consideration the time and force required to cut the coagulum of curd has been developed (method B) and compared with that measured and expressed in g (method A). The mean curd tension of cow, buffalo and mixed milk by the method A was 47.57, 80.38 and 74.22 g and by method B was 40.04, 54.16 and 44.98 g seconds respectively. The decrease in curd tension due to homogenisation by method B was 85-58% and by method A 31.82% for cow milk and the corresponding decreases for buffalo milk were 37.25 and 54.87% respectively. KAR

YOGHURT

- 1019 TOBA (T), WATANABE (A) and ADACHI (S). Quantitative changes in sugars, especially oligosaccharides, during fermentation and storage of yoghurt. *J. Dairy Sci.* 66(1); 1983; 17-20

Lactose content (6.53) of yoghurt prepared by fermentation with *Lactobacillus bulgaricus* and *Streptococcus thermophilus* progressively decreased to 4.22 during fermentation. During fermentation, glucose and oligosaccharides increased to 0.04 and 0.08% respectively. BSN

- 1020 REDDY (GV), FRIEND (BA), SHAHANI (KM) and FARMER (RE). Antitumor activity of yoghurt components. *J. Food Prot.* 46(1); 1983; 8-11

WHEY

- 1021 BAER (RJ), FRANK (JF), LOEWENSTEIN (M) and BIRTH (GS). Compositional analysis of whey powders using near infrared diffuse reflectance spectroscopy. *J. Food Sci.* 48(3); 1983; 959-61, 989

CHEESE

- 1022 PARK (KY) and BULLERMAN (LB). Effect of cycling temperatures on aflatoxin production by *Aspergillus parasiticus* and *Aspergillus flavus* in rice and cheddar cheese. *J. Food Sci.* 48(3); 1983; 889-96

- 1023 CERVANTES (MA), LUND (DB) and OLSON (NF). Effects of salt concentration and freezing on Mozzarella cheese texture. *J. Dairy Sci.* 66(2); 1983; 204-13

- 1024 MAGRINI (RC), CHIRIFE (J) and PARADA (JL). A study of *Staphylococcus aureus* growth in model systems and processed cheese. *J. Food Sci.* 48(3); 1983; 882-5

- 1025 CHAPPEL (R). Functionality of cheese products in snack foods. *Cereal Foods World.* 29(3); 1984; 191-3

Cheese is used as a flavour in a variety of snack foods, whose value in USA markets is estimated at 1.5-2 billion dollars. The influence of cheese on colour, texture and nutrition of snack foods has been discussed in detail. JVS

ICE CREAM

- 1026 HAARMANN (HH) and HOLZMINDEN (RG). The composition and characteristics of various flavours for use in ice cream. *Confect. Prod.* 49(6); 1983; 308, 310

MEAT AND POULTRY

- 1027 BILTCLIFFE (DO), SHROUDER (JP), STEINER (EH) and WOOD (R). An assessment of acceptance sampling plans as applied to foodstuffs. *J. Food Technol.* 18(2); 1983; 143-51
- The application of acceptance sampling plans, based on criteria given in two U.S. Military Standards, to evaluate the sulphur dioxide content in the sausage meat portion of sausage rolls produced by a batch process has been investigated. It was found that acceptance sampling plans could be successfully drawn up using values given in the U.S. Military Standards and that the most economical plans which are statistically sound would probably be based on variables sampling with unknown standard deviations (s.d.). The critical requirement, that of normality of distribution of the criterion being considered throughout the batch, is shown to be complied with in this trial. AA
- 1028 NEWMAN (PB). Mechanically recovered meat - food from waste. *Food Flavour. Ingrid. Process. Packag.* 5(7); 1983; 26-7, 29-30
- 1029 HEATH (H). Some savoury flavours. *Food Flavour. Ingrid. Process. Packag.* 5(5); 1983; 20-23
- Discusses: meat and meat flavours; vegetable and vegetable flavours; herbs, spices and seasonings; and salt and salt substitution. BSN
- 1030 NEWMAN (PB). Video image analysis - a new technology for the meat industry. *Food Flavour. Ingrid. Process.* 5(11); 1983; 45, 47, 49
- Discusses the quantitative aspects which affect the composition of meat products and the application, operation and advantages of the use of video image analysis. BSN
- 1031 GUMPEN (SA) and FRETHEIM (K). A simple method for determination of total extractable protein in meat. *J. Food Sci.* 48(3); 1983; 986-7
- Determination of total extractable protein (TEP) in meat by accepted methods may yield erroneously high results due to turbidity in the extracts subjected to protein determination. A method is proposed involving the use of a microfilter which clarifies the extract and thereby circumvents the problem. The new method also takes advantage of the observations that extraction may be carried out at room temperature after simple grinding through a 3 mm hole plate. AA

BEEF

- 1032 GOKALP (HY), OCKERMAN (HW), PLIMPTON (RF) and HARPER (WJ). Fatty acids of neutral and phospholipids, rancidity scores and TBA values as influenced by packaging and storage. *J. Food Sci.* 48(3); 1983; 829-34

The fatty acid (FA) of neutral lipids (NL) and phospholipids (PL) and this composition's relationship to rancidity score and TBA values of cooked beef patties, during frozen storage at times up to 4½ months under vacuum and nonpackaged conditions were studied. The predominant FA in the NL was C_{18:1} (46.0%), followed by C_{16:0} at 29.2%. However, the PL fraction gave a more balanced distribution of FA. In the neutral lipid fractions, reduction in the C_{16:1} and C_{18:2} fatty acids made significant contributions to increased rancidity scores and TBA values but in the phospholipid fraction, changes in the C_{18:3} and C_{20:4} were of greatest importance. After 3 months of frozen storage a regression model containing the neutral lipid fatty acids C_{18:1} and C_{18:2} and the phospholipid fatty acids C_{18:3} and C_{20:4} accounted for 88% and 85% of the variation in rancidity score and TBA value.

AA

- 1033 TURGUT (H) and SINK (JD). Factors affecting the emulsifying capacity of bovine muscle and muscle proteins. *J. Food Sci.* 48(3); 1983; 841-3
- 1034 MILLER (AT), KARMAS (E) and FU LU (M). Age-related changes in the collagen of bovine corium: Studies on extractability, solubility and molecular size distribution. *J. Food Sci.* 48(3); 1983; 681-5, 707
- 1035 Mc PROUD (LM) and LUND (DB). Thermal properties of beef loaf produced in food service systems. *J. Food Sci.* 48(3); 1983; 677-80
- 1036 ROBERTSON (J), BOUTON (PE), HARRIS (PV), SHORTHORSE (WR) and RATCLIFF (D). A comparison of some properties of beef and buffalo (*Bubalus bubalis*) meat. *J. Food Sci.* 48(3); 1983; 686-90
- 1037 SINK (JD), TURGUT (H), MANN (OM), WEAKLEY (DF) and ESCOUBAS (JR). Effect of age and sex on the biophysical properties of fresh beef muscle from bullocks and steers. *J. Food Sci.* 48(3); 1983; 844-7
- 1038 ARMBRUSTER (G), NOUR (AYM), THONNEY (ML) and STOUFFER (JR). Changes in cooking losses and sensory attributes of angus and holstein beef with increasing carcass weight, marbling score of longissimus ether extract. *J. Food Sci.* 48(3); 1983; 835-40
- 1039 TONG (AKW), NEWMAN (JA), MARTIN (AH) and FREDEEN (HT). Influences of time and combinations of equipment and operator on ultrasonic rib fat measurements for prediction of beef carcass composition. *Can. J. Anim. Sci.* 63(2); 1983; 315-24
- 1040 HARRISON (MA), DRAUGHON (FA) and MELTON (CC). Inhibition of spoilage bacteria by acidification of soy extended ground beef. *J. Food Sci.* 48(3); 1983; 825-8
- 1041 KOOHMARAIE (M), KENNICK (WH), ELGASIM (EA), DICKSON (RL) and SANDINE (WE). Effect of prerigor pressurization on the retail characteristics of beef. *J. Food Sci.* 48(3); 1983; 998-9
- 1042 OCKERMAN (HW) and SZCZAWINSKI (J). Effect of electrical stimulation on the microflora of meat. *J. Food Sci.* 48(3); 1983; 1004-5
Electrical stimulation caused an initial reduction in pH and in aerobic plate count (APC) of a mixed microflora inoculated beef tissue (50 ± 10 g, *M. sternocephalicus*) but reduction in microflora became less significant during aerobic product storage to 14 days at 0-2 C. Electrical

stimulation also reduced the APC of samples stimulated before inoculation but the reduction was not large enough to be significant. Both electrical stimulation and levels of NaCl or NaNO₂ in the culture media reduced microbial count from beef tissue, but the interactions were not significant, indicating that a synergistic effect did not occur under these experimental conditions. AA

- 1043 JEREMIAH (LE), MARIN (AH) and ACHTYMICHUK (G). Effect of delayed chilling on the microbiological quality of beef carcasses. *Can. J. Anim. Sci.* 63(2); 1983; 463-7

- 1044 WAGNER (MK) and BUSTA (FF). Effect of sodium acid pyrophosphate in combination with sodium nitrite or sodium nitrite/potassium sorbate on *Clostridium botulinum* growth and toxin production in beef/pork frankfurter emulsions. *J. Food Sci.* 48(3); 1983; 990-91,993

- 1045 GALT (AM) and MacLEOD (G). Headspace sampling of cooked beef aroma using Tenax GC. *J. Agric. Food Chem.* 32(1); 1984; 59-64

A novel technique was developed and optimized for isolating genuine cooked beef aroma volatiles, using a modified headspace sampling procedure involving adsorption of the headspace vapours onto Tenax GC. Rapid heat desorption transferred the volatiles directly into a gas chromatography column for separation. The aroma isolation, heat desorption, and gas chromatographic techniques were validated sensorially. By use of combined gas-chromatography/mass spectrometry, 67 identifications were made, including 8 compounds tentatively identified for the first time in cooked beef aroma. The relevance of heterocyclic compounds, especially the thiazoles, is discussed. The isolates obtained can be directly analyzed sensorially, since there is no interference from solvent odour, and this enables complementary instrumental and sensory analyses of the desorbed aromas. AA

- 1046 MADHWARAJ (MS), NAIR (KKS), KADKOL (SB) and BALIGA (BR). Corned buff from buffalo meat. *Indian Food Packer.* 37(4); 1983; 83-7

The one step process for the production of in-can cured canned corned buff (corned buffalo meat) involves hot pickle curing of buffalo meat into thin slices and grinding with fat, sodium chloride, sodium nitrate, sodium tripolyphosphate and wheat semolina and canning in lacquered cans. The samples were incubated at 35 C and 55 C for 15 days and at 25-32 C for one year. Corned beef and buff were analysed for moisture, protein, fat, ash, NaCl and nitrite contents. Addition of 3% wheat semolina and 1% tripolyphosphate prevented water separation and facilitated cutting of the product into thin slices. The canned corned buff had a shelf life of one year at 25-32 C. BSN

- 1047 PRASADA RAO (R), AZEEMODDIN (G), ATCHYUTA RAMAYYA (D) and THIRUMALA RAO (SD). Extraction of tallow from meat offal. *J. Food Sci. Technol. (India)* 20(5); 1983; 247-8

Fat was extracted from meat offal of bovine origin. Meat offal contained 8.9% moisture, 26.5% fat and 49.0% protein; by using hexane the yield of fat was 25%. The fat had acid value, 7.0, saponification value 192, iodine value, 34.5 and unsaponifiable matter 4.0%. Direct bleaching did not reduce the colour significantly, but when the crude fat was pretreated with oxalic acid and subsequently bleached with earth and carbon, a light coloured fat was obtained. Loss while refining was 25%. KAR

- 1048 CHANG (C-W), SEBRANEK (JG), WALKER (HW) and GALLOWAY (DE). Packaging film permeability in conjunction with sodium nitrite, potassium sorbate or lactic acid starter culture for control of *Clostridium sporogenes* (PA3679) growth in sliced bologna. *J. Food Sci.* 48(3); 1983; 861-4

SHEEP

- 1049 MOLLER (AJ), BOUTON (PE), HARRIS (PV) and JONES (PN). Effect of electrical stimulation on the tenderization of mutton by aging. *J. Food Sci.* 48(3); 1983; 874-7, 896

The effect of high voltage electrical stimulation (800V RMS, 10 ms pulse width, 14.3 Hz for 90 seconds) on the tenderization due to aging of meat at 0-1 C has been studied by obtaining Warner-Bratzler shear force deformation curves of cooked longissimus dorsi and semimembranosus muscles from young and old sheep. For muscles restrained from myofibrillar shortening, stimulation did not result in any significant improvement in shear parameters nor was the aging process affected. For muscles able to shorten, stimulation produced a substantial reduction in shear force values to the level obtained for restrained muscle. Shear force measurements on samples pressure-heat treated, to minimize myofibrillar strength, indicated that major structural changes in connective tissue, due to electrical stimulation, were unlikely. AA

- 1050 RAY (B) and FIELD (HA). Bacteriology of restructured lamb roasts made with mechanically deboned meat. *J. Food Prot.* 46(1); 1983; 26-8

- 1051 BHAGIRATHI (B), VIJAYA RAO (D), SHARMA (TR), GOPALA RAO and D'SOUZA (J). Bacterial quality of fresh mutton from market. *J. Food Sci. Technol.* (India) 20(5); 1983; 216-9

200 market samples of meat collected during 1978-81 from 3 sources were analyzed for total plate count (TPC) and compared with the laboratory maintained (25 ± 2 C. and 70 ± 5% RH) samples. Majority of samples had bacterial count between 10⁴ and 10⁵/g. Contamination in the laboratory maintained samples was low. Bacterial contamination of mutton is not related to the prevailing weather conditions. Exposure of fresh mutton for 6-8 hours to atmosphere in the slaughter house leads to rapid proliferation of the contaminants. KAR

- 1052 SMITH (GC), SEIDEMAN (SC), SAVELL (JW), DILL (CW) and VANDERZANT (C). Vacuum packaging versus modified atmosphere packaging of lamb loins. *J. Food Prot.* 46(1); 1983; 47-51,57

PORK

- 1053 ZIMMERMANN (WJ). Evaluation of microwave cooking procedures and ovens for devitalizing *Trichinae* in pork roasts. *J. Food Sci.* 48(3); 1983; 856-60, 899

- 1054 UNKLESBAY (N), DAVIS (ME) and KRAUSE (G). Nutrient retention in pork, turkey breast and corned beef roasts after infra red and convective heat processing. *J. Food Sci.* 48(3); 1983; 865-8, 904

- 1055 IGBINEDION (JE), CAHILL (VR), OCKERMAN (HW), PARRETT (NA) and VANSTAVERN (BD). Effects of packaging method, display light and storage time on the microbial growth and rancidity of fresh pork. *J. Food Sci.* 48(3); 1983; 848-52

Effects of display $\frac{1}{2}$ light, packaging methods and storage time on total aerobic, lipolytic and proteolytic counts and oxidative rancidity of fresh pork stored at 2 ± 1 C were studied at the initial, 7th, 14th and 21st day of storage. Display light significantly increased the total aerobic psychrotroph count. Effects on lipolytic and proteolytic psychrotroph counts were not significant. No anaerobic psychrotrophs were encountered. Total and proteolytic counts of PVC film overwrapped chops and proteolytic and lipolytic psychrotroph counts of chops vacuum packaged accelerated linearly with time. Increases in lipolytic psychrotroph count of PVC packaged and total aerobic psychrotroph count of vacuum packaged chops were quadratic. TBA number and rancid odour scores were not significantly affected by treatments. AA

- 1056 YANG (TS), HAWRYSH (ZJ), PRICE (MA) and AHERNE (FX). Effect of dantrolene sodium on pork quality from pigs stunned by captive-bolt. *Can. J. Anim. Sci.* 63(2); 1983; 299-302
- 1057 KEETON (JT). Effects of fat and NaCl/phosphate levels on the chemical and sensory properties of pork patties. *J. Food Sci.* 48(3); 1983; 878-81, 885
- 1058 LEE (M-L), GRAY (JI) and PEARSON (AM). Effects of frying procedures and compositional factors on the temperature profile of bacon. *J. Food Sci.* 48(3); 1983; 817-9, 927
- 1059 LEE (ML), GRAY (JI), PEARSON (AM) and KAKUDA (Y). Formation of N-nitrosopyrrolidine in fried bacon: Model system studies. *J. Food Sci.* 48(3); 1983; 820-24

RABBIT

- 1060 VIDALENCE (P), COTTIN (P), MERDADI (N) and DUCASTAING (A). Stability of two Ca^{2+} -dependent neutral proteinases and their specific inhibitor during post-mortem storage of rabbit skeletal muscle. *J. Sci. Food Agric.* 34(11); 1983; 1241-50

POULTRY

- 1061 GUPTA (HC) and NADKARNI (UG). Efficiency of production factors in commercial poultry farms in Delhi (1969-71). *Indian Vet. J.* 61(1); 1984; 64-8

CHICKEN

- 1062 PIKUL (J), LESZCZYNSKI (DE) and KUMMEROW (FA). Elimination of sample auto-oxidation by butylated hydroxytoluene additions before thiobarbituric acid, assay for malonaldehyde in fat from chicken meat. *J. Agric. Food Chem.* 31(6); 1983; 1338-42

- 1063 TANG (J), JIN (QZ), SHEN (G-H), HO (C-T) and CHANG (SS). Isolation and identification of volatile compounds from fried chicken. *J. Agric. Food Chem.* 31(6); 1983; 1287-92

The isolated volatile flavour compounds of fried chicken were subjected to extensive gas chromatographic fractionation, and the pure fractions obtained were identified by gas chromatography-mass spectrometry. A total of 130 compounds were identified. The compounds identified in the volatiles of fried chicken included hydrocarbons, alcohols, aldehydes, ketones, acids, esters, pyrazines, pyridines, thiazoles, thiazolines, oxazoles, oxazolines, thiophenes, pyrroles, furans, a trithiolane, a trithiane, and thialdine. AA

- 1064 FIRSTENBERG EDEN (R), ROWLEY (DB) and SHATTUCK (GE). Competitive growth of chicken skin microflora and *Clostridium botulinum* type E after an irradiation dose of 0.3 Mrad. *J. Food Prot.* 46(1); 1983; 12-5

Irradiation (0.3 Mrad, 5 C) of chicken skin exudate reduced the microflora from 10^4 to 10^6 to 500 cells 7 cm^2 , whereas *Clostridium botulinum* type E (Beluga) spores decreased by only one $\log_{10}$ within 8 days, irradiation survivors of natural flora at 10 C, multiplied and produced spoilage odours. *C. botulinum* survivors, however, could not do so in 14 days. At an abuse temperature of 30 C, natural survivors showed growth rates faster than *C. botulinum* spores and produced off odour, before turning toxic. BSN

- 1065 HOEY (JM), DUKES (MG) and JANKY (DM). Tenderness and sodium content of Pectoralis superficialis from broilers chilled in potassium or sodium chloride ice slush. *J. Food Sci.* 48(3); 1983; 675-6

TURKEY

- 1066 McNEIL (M) and PENFIELD (MP). Turkey quality as affected by ovens of varying energy costs. *J. Food Sci.* 48(3); 1983; 853-5

Energy consumption of microwave, convection, and conventional ovens was monitored as boneless turkey roasts were cooked. The microwave and convection ovens were more energy efficient than was the conventional oven. Total cooking losses and expressible moisture indices did not differ among the roasts. Shear values for microwave roasts were higher than those for convection roasts but were similar to those of conventional roasts. An experienced sensory panel found no differences in doneness, appearance, juiciness, and flavour among roasts after they had been stored in a refrigerator overnight but did find that the microwave roasts were less tender than were the others. A 72-member consumer panel did not express any preferences among the roasts in a multiple-paired comparison test. AA

EGG

- 1067 KATO (Y), MATSUDA (T), WATANABE (K) and NAKAMURA (R). Immunochemical studies on the denaturation of ovalbumin stored with glucose. *J. Food Sci.* 48(3); 1983; 769-72

The ovalbumin denaturation induced by Maillard reaction with glucose was investigated by immunochemical methods. The storage for either 2 or 10 days at 50 C and 65% relative humidity decreased the maximum immunoprecipitation to 90 and 80% of that by native protein, respectively. Ten day-

stored ovalbumin was separated into two fractions with antigenicity (fr-II) and without (fr-I) by the immunoaffinity chromatography of antiovalbumin-coupled Sepharose 4B. The circular dichroism (CD) analysis showed that fr-II, containing amino groups in almost the same amount as fr-I, retained a large amount of ordered structure. Ovalbumin molecules were presumably not denatured by only the modification of amino groups with glucose in an early stage of Maillard reaction. AA

- 1068 KATO (Y), WATANABE (K), NAKAMURA (R) and SATO (Y). Effect of pre-heat-treatment on tryptic hydrolysis of Millard-reacted ovalbumin. *J. Agric. Food Chem.* 31(2); 1983; 437-41

- 1069 FEISER (GE) and COTTERILL (OJ). Composition of serum and sensory evaluation of cooked-frozen-thawed scrambled eggs at various salt levels. *J. Food Sci.* 48(3); 1983; 794-7

The effect of 0.0-1.0% salt on the amount and composition of serum expressed from cooked frozen-thawed scrambled eggs at pH 6.8 and 7.6 was determined. Serum volume decreased with increasing concentration of salt but the total solids, protein, ash, lipids, sodium chloride, potassium, iron and phosphorus levels in the serum increased. Some of the globulins and live-tins were absent in DISC gel electrophoretograms at all salt concentrations while lipovitellin, ovomacroglobulin and albumen bands were more intense at levels about 0.4%. Sensory evaluation indicated that cooked-frozen-thawed-reheated scrambled egg was more intense in saltiness than fresh scrambled egg with equal amounts of added salt. AA

SEAFOODS

- 1070 CHEUK (WL) and FINNE (G). Enzymatic determination of urea and ammonia in refrigerated seafood products. *J. Agric. Food Chem.* 32(1); 1984; 14-8

An enzymatic method for the determination of both urea and ammonia in fresh seafoods was investigated. The method involves the transamination of α -ketoglutarate in the presence of glutamate dehydrogenase and NADH. The consumption of NADH as measured at 340 nm is stoichiometrically equivalent to the amount of ammonia in the test sample. Urea is determined by the same reaction scheme after the addition of urease. When this enzymatic method was used to determine the quality of refrigerated shrimp and crab meat, both ammonia and urea were shown to increase during storage and there was also good correlation between the concentration of both these compounds and traditional spoilage indicators. AA

- 1071 WEKELL (JC), TEENY (FM), GAUGLITZ (EJ) Jr., HATHORN (L) and SPINELLI (J). Implications of reduced sodium usage and problems in fish and shell fish. *Food Technol.* 37(9); 1983; 51-8

The sodium values obtained by an indirect method using a chloridimeter gave poor results for sodium value as compared to a direct method. Sodium analysis was carried out of canned tuna, salmon products and shrimp meats and the data have been given with mean values and standard deviations. The sodium uptake by fishes and also the macromineral composition of Dover sole during refrigerated sea water have been investigated and data provided. During brine freezing studies, both sodium hexameta phosphate and potassium tripolyphosphates appear more effective than either calcium chloride or magnesium chloride in reducing sodium penetration into fishes. JVS

1072 VENUGOPAL (V), ALUR (MD) and LEWIS (NF). Extracellular protease from *Pseudomonas marinoglutinosa*: Some properties and its action on fish actomyosin. *J. Food Sci.* 48(3); 1983; 671-4, 702

1073 KENT (M). The effects of spoilage on the dielectric properties of frozen fish. *J. Sci. Food Agric.* 34(11); 1983; 1289-96

The work has demonstrated that for cod and haddock, atleast the dielectric dispersion of frozen fish at -78.5 C has certain spoilage dependent parameters. It is concluded that (a) d.c. conductivity is not spoilage dependent, (b) ϵ'' of the dispersion is spoilage dependent and (c) point (b) results in ϵ'' at 1.5 with KHz being spoilage dependent. KAR

SHARK

1074 BILINSKI (E), JONAS (REE) and PETERS (MD). Factors controlling the deterioration of the spiny dogfish, *Squalus acanthias*, during iced storage. *J. Food Sci.* 48(3); 1983; 808-12

COD

1075 OHSHIMA (T), WADA (S) and KOIZUMI (C). Enzymatic hydrolysis of phospholipids in cod flesh during cold storage. *Bull. Jpn. Soc. Sci. Fish.* 49(9); 1983; 1397-404 (Japanese)

Cod fish was stored at -16 C for 24 weeks. The contents of phosphatidyl choline (PC) and phosphatidyl ethanolamine (PE) decreased rapidly during storage for upto 11 weeks. During the 24 week storage period 72.5% of PC and 52.2% of PE were hydrolysed. Hydrolysis of PE was faster than PC. The contents of free fatty acids increased rapidly during storage upto 11 weeks and then slowly. KAR

PEARL SPOT

1076 VARMA (PRG), MATHEN (C) and THOMAS (F). Quality changes and shelf life of pearl spot, mullet and tilapia during storage at ambient temperature and in ice. *J. Food Sci. Technol. (India)* 20(5); 1983; 219-22

Pearl spot (*Etroplus suratensis*), mullet (*Liza corsula*) and tilapia (*Tilapia mossambica*) collected fresh were stored separately at (i) ambient temperature (28-30 C) and (ii) in ice at 0 C and the changes in the physical, biochemical, bacteriological and sensory characteristics were noted. The shelf life of tilapia at (i) and (ii) was 10 hours and 11 days, of pearl spot 10 hours and 12 days, and of mullet 8 hours and 6 days respectively. The total plate count, total volatile N observed at 3 days interval over a 12 days storage period for fish stored at 37 C, 28-30 C and in ice are tabulated. The inelectron fish tester reading showed no significant change in those stored at (i); but those stored in (ii) showed significant changes. During storage at (i), the black colour of tilapia changed to white and to reddish tinge on spoilage, while in pearl spot the colour change was from black to yellow. Those stored in (ii) did not show any colour change. In mullet, those kept in (ii) showed bursting of belly and protrusion of the vent. KAR

SHELLFISH

- 1077 HOOD (MA), NESS (GE) and BLAKE (NJ). Relationship among fecal coliforms, *Escherichia coli* and *Salmonella* spp. in shellfish. *Appl. Environ. Microbiol.* 45(1); 1983; 122-6

- 1078 RAYUDU (GV) and CHANDRA MOHAN (P). Cephalopod fishery and its marketing in India. *Seafood Export J.* 15(7); 1983; 21-2

The cephalopod fishery in India represented by squid and cuttlefish accounts for about 4% of the marine fish landings, and is next in importance to prawns and finfish. The coasts of Gujarat, Maharashtra, Kerala, Tamil Nadu, and Andhra Pradesh are the major sites for cephalopod landings. The important species of landed cuttlefish are *Sepia aculeata* Ferussac and d'Orbigny, and *S. pharaonis*; the important species of squids are *Sepioteuthis lessoniana*, Lesson, *Loligo duvauceli* d'Orbigny, and *Dorytenthis singhalensis* (Ortmann). Brief notes on the catching and marketing of cephalopods have been provided. KMD

PRAWN

- 1079 SANTHANAKRISHNAN (G). X. Diversification of products and markets: *Acetopus indicus* a wealthy marine resource for export through diversification. *Seafood Export J* 15(7); 1983; 5-7

Acetopus indicus is a non-penacid prawn which accounts for about 50,000 tonnes of the marine fish landings in India. It resembles the "krill" of Atlantic waters, and can be exported in dry form, e.g. to Japan where it is possible to market this product. A simple method of processing, drying and grading has been described that will yield a product of export quality. KMD

SHRIMP

- 1080 JOHNSTON (JJ), GHANBARI (HIA), WHEELER (WB) and KIRK (JR). Chlorine incorporation in shrimp. *J. Food Sci.* 48(3); 1983; 668-70

- 1081 CHANG (O), CHEUK (WL), NICKELSON (R), MARTIN (R) and FINNE (G). Indole in shrimp: Effect of fresh storage temperature, freezing and boiling. *J. Food Sci.* 48(3); 1983; 813-6

The development of indole, total volatile nitrogen, trimethylamine and total aerobic plate count (APC) in shrimp stored in ice, at 4 C, 12 C and 22 C were investigated. At low temperature storage, final indole levels in severely decomposed shrimp (APC >10⁸/g) were much lower than the 25 µg indole/100 g shrimp which has been suggested as the defect action level for shrimp decomposition by the Food and Drug Administration. At higher storage temperatures, (12 and 22 C), indole formation was greatly accelerated resulting in very high indole levels. The net result is that while indole levels indicate decomposition, decomposed shrimp may not necessarily contain indole. Frozen storage and cooking had little effect on indole levels in acceptable quality shrimp. Indole is of value in assessing the history of shrimp if high temperature abuse is suspected. AA

BLUE CRAB

- 1082 DOWDIE (OG) and BIEDE (SL). Influence of processing temperature on the distribution of tissue and water-soluble proteins in blue crabs (*Callinectes sapidus*). *J. Food Sci.* 48(3); 1983; 804-7,812

SCALLOP

- 1083 BREMNER (HA) and STATHAM (JA). Spoilage of vacuum-packed chill-stored scallops with added *Lactobacilli*. *Food Technol. Aust.* 35(6); 1983; 284-7

OYSTER

- 1084 BURNS (MC), RICHTER (ER), BANWART (GL) and RHEINS (MS). A new procedure for the differentiation of *Vibrio cholerae* and non-*V. cholerae* recovered from oysters. *J. Food Sci.* 48(3); 1983; 1002-3

PROTEIN FOODS

Nil

FRUIT JUICES AND BEVERAGES

- 1085 DAY (A). The microbiology of soft drinks. *Food Flavour Ingred. Packag. Process.* 5(9); 1983; 28-9

A brief discussion on the spoilage organisms, their distribution and factors involving stability of soft drinks. BSN

- 1086 MA (C-Y), AMANTEA (GF) and NAKAI (S). Production of nonbitter, desalted milk hydrolysate for fortification of soft drinks and fruit juices. *J. Food Sci.* 48(3); 1983; 897-9

A simpler and less expensive process than the process of Helbig *et al.* (1980) for preparation of a nonbitter, desalted milk hydrolysate is presented. Skim milk was hydrolyzed with Alcalase (subtilisin Carlsberg) at 50 C in 3 hours. The resin in OH form was added to milk batchwise to simultaneously raise the pH to 8.5 for optimum proteolysis and exchange the anions in milk which contributed to saltiness. These modifications resulted in a shorter hydrolysis time and a more economical resin regeneration than those of the Helbig process. The dried milk hydrolysate was added to soft drinks and fruit juices at solids concentrations up to 10% (3% protein) without adverse effects on their taste, colour, viscosity and clarity. AA

- 1087 NATARAJAN (CP), ABRAHAM (KO) and SHANKARANARAYANA (ML). Trends and prospects of the soft drink industry. *Indian Food Ind.* 2(2); 1983; 43-9

- 1088 MARTIN (GJ), MARTIN (ML), MABON (F) and MICHON (MJ). A new method for the identification of the origin of ethanols in grain and fruit spirits: High-field quantitative deuterium nuclear magnetic resonance at the natural abundance level. *J. Agric. Food Chem.* 31(2); 1983; 311-5

It is shown that very different internal natural distributions of the deuterium isotope exist in ethanol samples from various origins. Quantitative ^2H NMR at the natural abundance level provides a new and efficient tool for investigating these distributions, and original selective parameters are introduced. Thus, the R parameter varies from about 2.2 for gins and rums which are obtained from corn and sugarcane, respectively, to 2.7 for ethanols extracted from sugar beet, and bourbon whiskies are unambiguously differentiated from malt scotch whiskies. The method is also capable of providing the overall ^2H content obtainable by mass spectroscopy. Moreover, the selectivity of the NMR method enables information to be obtained on the biosynthetic mechanisms which intervene in the formation of the ethanol and on the influence of the climatological factors. AA

FRUIT JUICE

- 1089 ROGUEL (E). Fruit juices and beverages production and consumption. *Flüssiges Obst.* 50(5); 1983; 232-6 (German)
- 1090 ANON. Aseptic packaging of juices at Hammersmith. *Int. Bottler Packer.* 57(3); 1983; 84

GRAPE JUICE

- 1091 MORRIS (JR), SIMS (CA) and CAWTHON (DL). Effects of excessive potassium levels on pH, acidity and colour of fresh and stored grape juice. *Am. J. Enol. Vitic.* 34(1); 1983; 35-9

Excessive rates of three dosages of potassium applied throughout the growing season to two-year-old container grown concord (*Vitis labrusca* L.) resulted in high juice pH levels leading to problems of colour stability during storage. BSN

CITRUS JUICE

- 1092 COHEN (E) and SAGUY (I). Measurements of oxygen-18/oxygen-16 stable isotope ratio in citrus juice: A comparison of preparation methods. *J. Agric. Food Chem.* 32(1); 1984; 28-30

ORANGE JUICE

- 1093 CHANDLER (BV) and ROBERTSON (GL). The solubility of limonin, the bitter principle of orange juice. *J. Sci. Food Agric.* 34(11); 1983; 1272-84
- The study indicated that although sugars and pectins had no detectable effect on the solubilisation of limonin at 25 C, they markedly increased the amount of limonin passing into solution on heating. In addition they affected the position of equilibrium in these solutions on cooling and the rate at which equilibrium was reached. KAR

- 094 VIDYASAGAR (K) and ARYA (SS). Stability of sorbic acid in orange squash. *J. Agric. Food Chem.* 31(6); 1983; 1262-4

Degradation of sorbic acid (SA) in orange squash was appreciable when stored in polypropylene pouches, but very slight when stored in laminate pouches and glass bottles. In model systems also, the degradation of SA was high in polyethylene and polypropylene pouches but negligible in saran coated cellopoly and laminate pouches. Metabisulphite and fruit acids acted as prooxidants while sucrose above 5% decreased the rate of degradation. AA

PEAR JUICE

- 1095 MONTGOMERY (MW). Cysteine as an inhibitor of browning in pear juice concentrate. *J. Food Sci.* 48(3); 1983; 951-2

Pear juice concentrates were prepared from juices treated with 0-2 mM cysteine and colour changes of the concentrates were observed during storage at 1, 21 and 38 C for 6 months. Initial browning of the concentrates were eliminated by the cysteine treatment of the pear juice. Rate of browning of the concentrates increased with increasing storage temperature and decreasing cysteine concentrations. Cysteine concentration of the concentrates decreased during storage and the rate of decrease was a function of storage temperature. Cysteine appeared to retard the Maillard reaction in the concentrates. No deleterious changes in flavour intensity were noted in the stored cysteine-treated concentrates. AA

APPLE JUICE

- 1096 DICHARA (RO) and PUENTES de LEROY (MB). Argentina. Apple juice and aroma industry in the Rio Negro region. *Flussiges Obst.* 50(5); 1983; 245-8 (German)

COCOA BEAN

- 1097 HENDERSON (S). The moisture content - equilibrium relative humidity relationship of cocoa beans. *J. Stored Prod. Res.* 20(1); 1984; 1-4

The moisture content-equilibrium relative humidity relationships for cocoa beans grown in nine different countries were similar to each other, and the maximum safe storage moisture content in equilibrium with 70% relative humidity was between 6.0 and 7.9% at 25 C. There was a large variation between the moisture content of individual beans within each sample, the maximum standard deviation observed in a sample of thirty beans being 0.97, after the moisture content had been increased by adding water. AA

COFFEE

- 1098 ROBERTS (HR) and BARONE (JJ). Caffeine - history and use. *Food Technol.* 37(9); 1983; 32-9

A comprehensive review covering the history, sources (coffee, tea, cocoa, soft drinks and drug products) and levels (a table gives range and average content of caffeine), consumption estimates, a coffee drinking

study, oral intake of caffeine by pregnant women and time distribution of caffeine intake. JVS

- 1099 Von BORSTEL (RW). Caffeine - metabolism. *Food Technol.* 37(9); 1983; 40-43

An introductory overview of the current knowledge and hypotheses about the metabolism of caffeine (in man and other species) and the biochemical interactions mediating some of caffeine's more important functions. The tables provide data on caffeine biotransformation (in man and other animals) and factors modifying caffeine elimination, in man. JVS

- 1100 BLAUCH (JL) and TARKA (SM) Jr. HPLC determination of caffeine and theobromine in coffee, tea, and instant hot cocoa mixes. *J. Food Sci.* 48(3); 1983; 745-7, 750

Popular brands of instant and ground coffee, instant and bag tea, and instant hot cocoa mixes were prepared according to manufacturer's directions and analyzed for caffeine and/or theobromine content. After extraction into boiling water, the methylxanthines were separated by high performance liquid chromatography using a reverse phase C₁₈ column and a mobile phase of acetonitrile and water (8:92, v/v). Caffeine content ranged from 32.4-35.0 mg/cup in instant tea, 30.2-67.4 mg/cup in bag tea, 1.0-7.8 mg/cup in instant hot cocoa mixes, 46.7-67.6 mg/cup in instant coffee, and 93.0-163.5 mg/cup in ground coffee. Theobromine concentrations ranged from 1.4-2.3 mg/cup in instant tea, 1.2-4.4 mg/cup in bag tea, and 39.5-79.5 mg/cup in instant hot cocoa mixes. AA

- 1101 LEVITON (A). Caffeine - behavioural effects. *Food Technol.* 37(9); 1983; 44-7

Review of literature on the behavioural effects of caffeine in adult humans and covering laboratory studies (sleep latency, mood, performance), observational studies (psychiatric patients, students and others). JVS

- 1102 MILES (CI). Caffeine - FDA status. *Food Technol.* 37(9); 1983; 48-50

A brief resume concerning two FDA proposals on caffeine, and the position regarding the proposal expected soon. The highlights expected in the new proposal are: (a) its tentative conclusion regarding use of caffeine in soda water; and (b) up-to-date progress report on studies carried out to answer questions in 1980 proposal. JVS

TEA

- 1103 NAGALAKSHMI (S) and SESHADRI (R). A study of nitrogenous constituents of tea cream. *J. Food Sci. Technol.* (India) 20(5); 1983; 243-4

A strong infusion of black tea cools down to room temperature. It gives rise to the formation of a cream. This cream is not desirable in the instant tea manufacture. Cream from hot soluble and cold soluble tea was isolated and analysed for total N, caffeine, N and protein. The total N and protein is higher in hot cream than in cold cream. Proteins to a larger extent and soluble caffeine to a lesser extent contribute to composition of cream isolated at ambient temperature compared to that isolated at 4°C. The polymeric polyphenols expressed as tannins do not contribute to cream formation at ambient temperature, but one major constituent of cream has been isolated at lower temperature. There is also hydrogen bonded interactions between tea polyphenols and the N substances present in the

tea infusion. No free amino acid is involved in the cream formation, but proteins play a dominant role. Theamine, also does not take part in cream formation. KAR

GRAPEMUST

- 1104 ETHIRAJ (S), SURESH (ER) and ONKARAYYA (H). Controlled deacidification of 'Bangalore Blue' grape must with *Schizosaccharomyces pombe*. *J. Food Sci. Technol. (India)* 20(5); 1983; 248-50

The wine prepared from Bangalore Blue grapes using *Schizosaccharomyces pombe* will have high acidity and off-flavour. To overcome this, *Saccharomyces cerevisiae* was either reinoculated to the fermenting must after 1 to 4 days of fermentation by *Sch. pombe* or different proportion of *S. cerevisiae* to *Sch. pombe* (10:90 to 50:50 proportion) was tried and the percentage reduction in acidity was noted. Addition of *S. cerevisiae* after 2 days to *Sch. pombe* fermenting must or inoculation of *S. cerevisiae* and *Sch. pombe* in 1:10 ratio produced wine with optimum acidity. KAR

WINE

- 1105 STREHAIANO (P) and GOMA (G). Effect of initial substrate concentration on two wine yeasts: Relation between glucose sensitivity and ethanol inhibition. *Am. J. Enol. Vitic.* 34(1); 1983; 1-5

- 1106 ZEE (JA), SIMARD (RE), HEUREUX (LL) and TREMBLAY (J). Biogenic amines in wines. *Am. J. Enol. Vitic.* 34(1); 1983; 6-9

Ion-exchange chromatographic analysis of biogenic amines in European wines revealed the presence of histamine, putrescine, cadaverine, and tyramine in detectable limits, while 1,3-di-aminopropane, agmatine and tryptamine were absent. Histamine and putrescine were present in red wines in significantly more amounts than in white wines. BSN

- 1107 FREEMAN (BM). Effects of irradiation and pruning of Shiraz grapevines on subsequent red wine pigments. *Am. J. Enol. Vitic.* 34(1); 1983; 23-6

Irrigation resulted in a reduction in the colour of wine prepared from *Vitis vinifera* cv. Shiraz in Australia which was accompanied by reduction in proportion of anthocyanins in the coloured form, which was due to an increase in the pH. Reduction in wine colour was traced to increase in berry size with irrigation of vine yards. Pruning reduced wine colour in one year. However, pruning in another year did not show any significant effect. BSN

- 1108 SINGLETON (VL) and TROUSDALE (E). White wine phenolics: Varietal and processing differences as shown by HPLC. *Am. J. Enol. Vitic.* 34(1); 1983; 27-34

Grape skin extracts and white wines with and without pomace contact were made for two vintages from Chenin blanc, French Colombard, Semillon, and Thompson Seedless. HPLC separated at least 124 substances absorbing in the ultraviolet. Seven of these have been identified and quantitated as gallic acid, caftaric acid, coumaric acid, catechin, epicatechin, astilbin, and engeletin. The retention times for these substances on three different reversed phase columns were different, but in the same sequence with coefficients of variation for known standards (5-7 replicates) typically

1-2% for retention time and 1.2-8.9% for peak area. Detection at 280, 292, or 320 nm gave considerably different absolute and relative peak areas depending on the absorbance maxima of the substances, but as long as the absorbance was appreciable and separation complete, fairly constant amounts were calculated. Contamination of the catechin peak with a substance having more absorbance at longer wavelengths illustrated a difficulty with direct quantitation by peak area alone on a complex chromatogram. Composition was similar within a grape variety and differed between varieties. Vintage differed also, but less so, but pomace contact made vary large compositional differences. Evidence is presented that specified components are added by extraction from seeds or skins and others are augmented or depleted by reactions such as hydrolysis and oxidation during processing. AA

- 1109 LIU (J-W) and GALLANDER (JF). Effect of pH and sulphur dioxide on the rate of malolactic fermentation in red table wines. *Am. J. Enol. Vitic.* 34(1); 1983; 44-6
- 1110 SHUMAN (FL). A small winery freezing unit for disgorging bottle-fermented champagne. *Am. J. Enol. Vitic.* 34(1); 1983; 47-8
The design and operational details of a small, economical device intended for freezing the necks of champagne bottles prior to the disgorging process has been described. BSN

OILS AND FATS

- 1111 ARRENDALE (RF), CHAPMAN (GW) and CHORTYK (OT). Gas chromatographic analysis of fatty acids on laboratory - prepared fused silica silar 10C capillary columns. *J. Agric. Food Chem.* 31(6); 1983; 1334-8
- 1112 FRIEDMAN (M) and GARTI (N). Maleyl esters of monoglycerides of saturated fatty acids. *J. Am. Oil Chem. Soc.* 60(6); 1983; 1134-41
- 1113 HAMPSON (JW) and ROTHBART (HL). Triglyceride specific heat determined by differential scanning calorimetry *J. Am. Oil Chem. Soc.* 60(6); 1983; 1102-4
The specific heats of three polymorphic forms of trilaurin, trimyristin, and tristearin have been determined by differential scanning calorimetry (DSC). Results from -90 to +100 C were obtained for the triglycerides, and compared with the values, obtained by classical methods, and given in the literature. There appears to be an α -to sub- α second order transition which is gradual, and not limited to a narrow temperature range. Apparently, the α -form stops most of its rotation at low temperatures, and takes up fixed positions. This explains (i) the decrease in specific heat, (ii) the appearance of a new X-ray short spacing as the α -form is cooled, and (iii) the appearance of a doublet in infra-red spectroscopy. KMD
- 1114 DALY (GG), FINOCCHIARO (ET) and RICHARDSON (T). Characterization of some oxidation products of β -sitosterol. *J. Agric. Food Chem.* 31(1); 1983; 46-50

OILS

- 1115 MIN (DB) and WEN (J). Effects of citric acid and iron levels on the flavour quality of oil. *J. Food Sci.* 48(3); 1983; 791-3, 864

A factorial design of four levels of added iron (0, 0.1, 1 and 5 ppm) and five levels of citric acid (CA) (0, 10, 50, 100, 150 ppm) was used to study interaction effects of citric acid and added iron on flavour quality of oils containing 0.1 ppm iron. Flavour qualities were evaluated by measurement of dissolved free oxygen disappearance and flavour compound formation in oils. When oils contained 0 or 0.1 ppm added iron, the five levels of CA did not affect flavour quality. But, when the oils contained 1 ppm of added iron, increasing the content of CA, rate of oxygen disappearance decreased and smaller concentrations of flavour compounds formed. Results also showed that as the iron content was increased, the rate of dissolved oxygen disappearance increased and the larger concentrations of flavour compounds formed in the oil. AA

COTTONSEED OIL

- 1116 FAN (LL), TANG (JY) and WOHLMAN (A). Investigation of 1-decyne formation in cottonseed oil fried foods. *J. Am. Oil Chem. Soc.* 60(6); 1983; 1115-9

It has been shown that 1-decyne-which is responsible for the "light-struck" off-flavour of potato chips - is a degradative product resulting from photo-oxidation of cyclopropenoid fatty acids (CPFA) naturally present in cottonseed oil. Chlorophyll plays the role of a photosensitizer in this reaction. A probable reaction mechanism has been suggested. KMD

PALM OIL

- 1117 KEHINDE (SM) and NNOLIM (BN). Solubility studies of palm oil in practical extraction solvents. *J. Agric. Food Chem.* 31(1); 1983; 162-4

Simple solubility studies for palm oil in common extraction solvents have been made. Solvents used were *n*-hexane and petroleum ether (bp 60-80 C). Palm oil was miscible in both solvents at concentrations between 5 and 95% mass fraction. The observed maximum miscibility temperature was 45 C for oil in *n*-hexane and 48.5 C in petroleum ether. These solvents would, therefore, be expected to be suitable for the primary extraction of palm oil from the fruit. AA

SOYABEAN OIL

- 1118 RACICOT (LD) and HANDEL (AP). Degumming of soyabean oil : Quantitative analysis of phospholipids in crude and degummed oil. *J. Am. Oil Chem. Soc.* 60(5); 1983; 1098-101

Phospholipids, isolated by GC and TLC, from crude and degummed soyabean oils obtained from four companies were studied. During the degumming process, the proportion of phosphatidylcholine decreased, and the proportion of unknown, non-polar, phosphorus compounds increased, in the samples from all the companies. The term "non-hydratable" phospholipids is a misnomer, as these phospholipids are hydrated to some extent. KMD

VEGETABLE OILS

- 1119 ALENCAR (JW), ALVES (PB) and CRAVEIRO (AA). Pyrolysis of tropical vegetable oils. *J. Agric. Food Chem.* 31(6); 1983; 1268-70

SPICES AND CONDIMENTS

CHILLI

- 1120 KESHINRO (OO) and KETIKU (OA). The contribution of tropical chillies to ascorbic acid consumption. *Food Chem.* 11(1); 1983; 43-9

Fresh and dry chillies of *Capsicum annum* and *Capsicum frutescens* grown in Africa were investigated for ascorbic acid content. The ascorbate value in the raw samples ranged from $4.6 \pm 0.3\%$ in the dry sample of one of the varieties of *C. frutescens* to $55.1 \pm 1.5\%$ in the fresh variety of one of the *C. frutescens* species. Cooking for 25 minutes encountered for the loss of 66 - 98.3% vitamin C in sauce. KAR

- 1121 HOFFMAN (PG), LEGO (MC) and GALETTO (WG). Separation and quantitation of red pepper major heat principles by reverse-phase high-pressure liquid chromatography. *J. Agric. Food Chem.* 31(6); 1983; 1326-30

A rapid, reverse-phase high pressure liquid chromatographic method is presented that will identify and quantitate the major heat principles (capsaicinoids) in red pepper products. The capsaicinoids are extracted from the ground spice with ethanol, separated by high-pressure liquid chromatography, and detected by ultraviolet absorption at 280 nm. The concentration of the individual capsaicinoids is determined relative to that of a commercially available external standard, N-vanillyl-n-nonamide (N-((4-hydroxy-3-methoxyphenyl)methyl)-n-nonamide). The data obtained by this method can be mathematically transformed into a sensory value. AA

FENUGREEK

- 1122 SAUVAIRE (YD), BACCOU (J-CF) and KOBREHEL (K). Solubilization and characterization of fenugreek seed proteins. *J. Agric. Food Chem.* 32(1); 1984; 41-7

Ninety percent of fenugreek proteins are located in cotyledons plus embryo(S) (C+E) that were separated from seed coat plus endosperm by a new method based on the differences of their density. Over 70% of C + E proteins are soluble in water, 5% in NaCl (0.86 M), and 7% in NaOH (0.05 M). A treatment of C + E with 2-propanol at 78 C in order to remove saponins for steroid preparations diminishes sharply the solubility of proteins in water; the removal of saponins at room temperature has little subsequent effect. The initial pH of a solution has little effect on protein solubility, except extreme values, between pH 1-4 and over pH 11. The electrophoretic compositions of albumins, globulins, and glutelins are very heterogeneous and dependent on solubilization conditions. The reduction of proteins with mercaptoethanol modifies considerably the electrophoretic patterns (PAGE-SDS) of albumins and globulins. According to their amino acid composition, the nutritional value of fenugreek proteins is similar to that of other legume proteins. AA

MANGO GINGER

- 1123 GHOLAP (AS) and BANDYOPADHYAY (C). Characterization of mango-like aroma in *Curcuma amada* Roxb. *J. Agric. Food Chem.* 32(1); 1984; 57-9

The essential oil of the rhizomes of *Curcuma amada* Roxb. was isolated by steam distillation, distillation-extraction, and low-temperature-high vacuum distillation techniques, and its composition with respect to mango aromatic principles was determined by gas chromatography and spectrometry. The oil was primarily composed of terpene hydrocarbons tentatively identified as α -pinene, car-3-ene, and *cis*-ocimene, where the latter two compounds contributed essentially the characteristic mango odour of this rhizome. AA

SENSORY EVALUATION

- 1124 CHRISTENSEN (CM). Effects of colour on aroma, flavour and texture judgments of foods. *J. Food Sci.* 48(3); 1983; 787-90

Twenty-nine subjects judged the aroma, flavour and texture of five pairs of foods that were normally coloured and either uncoloured or inappropriately coloured. Subjects were tested during conditions of hunger and satiation and approximately half of the subjects were blindfolded during both test sessions. The data revealed that, in general, appropriately coloured foods were perceived to have a stronger intensity and better quality aroma and flavour. The effects of colour were significant only for aroma judgments although the same trend was evident for flavour judgments. The state of hunger significantly influenced flavour but not aroma judgments but the pattern of changes did not appear to be related to food colour. Judgments of texture quality were not affected by the experimental manipulations. AA

- 1125 GILLESPIE (A). Assessing snacking behaviour of children. *Ecol. Food Nutr.* 13(3); 1983; 167-72

An objective method for assessing the quality of snack selections was developed which considers fiber, sodium and cholesterol content as well as nutrient density. The method was used to assess the snacking behaviour of fifth and sixth grade students in upstate New York. Although mean snack scores were low, snacks selected at home were better than those selected when away from home. AA

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

- 1126 MORRIS (ON). Protection of *Bacillus thuringiensis* from inactivation by sunlight. *Can. Entomol.* 115(9); 1983; 1215-27

Spore viability and residual insecticidal activity of *Bacillus thuringiensis* were rapidly reduced by solar radiation in the range of 300-400

nm wavelength. The addition of ultraviolet absorbers to a thricide spray formulation prolonged the insecticidal residual activity on coniferous tree.
KAR

- 1127 STUBBS (M) and GRIFFIN (R). The response of *Oryzaephilus surinamensis* (L). (Coleoptera : Silvanidae) to water. *Bull. Entomol. Res.* 73(4); 1983; 587-95

In the present study the effect of small amounts of water vapour on the behaviour of adults of *O. surinamensis* under various conditions was investigated. When the insects were preconditioned at 25,50,75 or 100% RH they were attracted to water source. KAR

- 1128 SECOY (DM) and SMITH (AE). Use of plants in control of agricultural and domestic pests. *Econ. Bot.* 37(1); 1983; 28-57

- 1129 PRASADA RAO (PVV), SESHIAH (K) and NAIDU (PR). Determination of malathion in formulations. *J. Agric. Food Chem.* 31(6); 1983; 1370-71

BIOCHEMISTRY AND NUTRITION

- 1130 WOLF (ID), RAPER (NR) and ROSENTHAL (JC). USDA activities in relation to the sodium issue - 1981-83. *Food Technol.* 37(9); 1983; 59-63

An overview of the research, information and educational projects undertaken by USDA to appraise the population on the implications of high intakes of dietary sodium. JVS

- 1131 MOORMAN (WFB), MOON (NJ) and WORTHINGTON (RE). Physical properties of dietary fiber and binding of mutagens. *J. Food Sci.* 48(3); 1983; 1010-11

- 1132 NEILSON (MJ) and MARLETT (JA). A comparison between detergent and nondetergent analyses of dietary fiber in human foodstuffs, using high-performance liquid chromatography to measure neutral sugar composition. *J. Agric. Food Chem.* 31(6); 1983; 1342-7

Dietary fiber analysis of wheat bran, peas, apples and a food composite, using the modified neutral detergent fiber (NDF) method and a nondetergent method, has been examined. In the latter method, starch hydrolysis was enhanced by using ultrasonics for gelatinization and a heat-stable α -amylase. Neutral sugar compositions, determined by high-performance liquid chromatography, of the insoluble fractions were similar, although, with the exception of wheat bran, neutral detergent extracted significantly more arabinans than did water. NDF contents of the foodstuffs were marginally lower than the corresponding nondetergent fiber contents, due to lower concentrations of uronic acids and lignin in the NDF residues. Water-soluble fractions recovered by the nondetergent method represented only a small portion of the dry matter of the foodstuffs studied. However, for apples and food composite the fraction occupied about 25% of the total dietary fiber content. AA

- 1133 AUGUSTIN (C) and POMAROLA (MH). Heavy metals and foods. *Ind. Aliment. Agric.* 100(1-2); 1983; 63-7 (French)

A collection of data (toxic dose, lethal dose, levels present in foods, etc.) on 12 metals that can occur in foods, viz: Pb, Hg, Cd, Sn, Zn, Cu, Al, Mg, Sb, Cr, Co and V. KMD

1134 MONTE (WC). Lack of gut absorption of solubilized polystyrene by the rat. *J. Agric. Food Chem.* 31(1); 1983; 174-5

1135 YOKOTSUKA (K) and KUSHIDA (T). An improved method for fluorometric amino acid analysis including proline and hydroxyproline. *J. Ferment. Technol.* 61(1); 1983; 1-6

The method included the oxidation of proline and hydroxyproline with sodium hypochlorite after ion-exchange fractionation and fluorophore formation with O-phthalaldehyde in the presence of 2-mercaptoethanol and a high concentration of Brix 35'. KAR

1136 MacBRIDGE (DE) and WYATT (CJ). Evaluation of a modified AOAC determination for thiamin and riboflavin in foods. *J. Food Sci.* 48(3); 1983; 748-50

Modifications of the AOAC thiamin and riboflavin methods allow determination of the two vitamins from aliquots of a single food sample with alternatives to obsolete or dangerous reagents. Mylase 100, an α -amylase enzyme which hydrolyzes thiamin esters, was shown to be effective at releasing thiamin in 3 hours over a pH range of 3.5-5.5, at 35 and 42 C. In thiochrome extraction, anhydrous isopropanol can be substituted for isobutanol, a suspected carcinogen. AA

1137 MOZERSKY (SM) and PANETTIERI (RA). Is pH drop a valid measure of extent of protein hydrolysis? *J. Agric. Food Chem.* 31(6); 1983; 1313-6

Utilizing nine foods as substrates, protein digestibility as determined by the two-step, pH-drop procedure of Satterlee *et al.* was compared to the extent of hydrolysis at the end of the incubation period. The extent to which the substrate protein was hydrolyzed was found to be much less than calculated digestibility, as expected. However, the digestibility and extent of hydrolysis did not correlate with one another in any reasonable way. It is concluded that, although pH drop can be used to follow the course of hydrolysis of a single substrate, and in spite of a demonstrated correlation between pH drop and in vivo protein digestibility, pH drop alone cannot serve as a measure of extent of protein hydrolysis for the comparison of different substrates. AA

1138 GAGNE (CM) and ACTON (JC). Fiber constituents and fibrous food residue effects on the in vitro enzymatic digestion of protein. *J. Food Sci.* 48(3); 1983; 734-8

In vitro digestibility of casein was significantly ($P < 0.05$) reduced as the fiber weight-to-protein weight ratio increased from 0.0:1.0 to 1.0:1.0 for isolated fiber constituents and fibrous food residues. For casein digestibility in the presence of fiber constituents, the reduction ranked in the following order: karaya gum > xylan > pectin > lignin > holocellulose. The order of reduction by fibrous food residues ranked as follows: kernel corn > blackeye pea > broccoli > brown rice > wheat bran. Gel filtration profiles of casein hydrolysates were generally not affected by the fiber constituents whereas significant alterations to greater molecular weight peptides occurred in the presence of food residues. The data supported the interaction of dietary fiber components by interference of the enzyme-substrate complex formation in proteolytic digestion. AA

1139 ANON. Federally supported human nutrition research, training and education: Update for the 1980s. *Nutr. Rev.* 41(1); 1983; 23-32

- 1140 HAENEL (H). Interdisciplinary consideration of factors that affect food consumption. *Ernährungsforschung*. 28(2); 1983; 53-6 (German)
- The factors that have to be examined in any discussion on the possibilities of guiding food consumption along improved patterns, have been analysed and listed under the following broad headings: (a) development of already existing good habits (breast feeding, infant nutrition, diet for diabetics, communal diet, dental health, etc.); (b) evolution of a scientifically well-founded, simply formulated, attractive and non-threatening form of argumentation that appeals to reason and emotions; (c) orientation towards target groups - active participation of such groups; (d) balanced accessibility, build-up, and usage of a uniform, socialistic, system of information, training, and education; (e) improvement of impressive and emotionally appealing information material (mass media, books, food advertisement and packaging); sobriety and credibility of the information - no attachment to special deficiency or excess situations - but rather, a long-term scientific orientation; (f) psychological research - e.g. to understand motivational processes within the scope of possible action. KMD

- 1141 BAIRAGI (R). Dynamics of child nutrition in rural Bangladesh. *Ecol. Food Nutr.* 13(3); 1983; 173-8

- 1142 JOHNSEN (D), MOHR (M) and GAGSCH (E). A modified weighing protocol for determination of the food consumption of children and adolescents. *Ernährungsforschung*. 28(2); 1983; 36-41 (German)

A detailed protocol, or questionnaire, has been drawn up for carrying out a survey of food consumption by children and adolescents. A simple weighing machine for weighing individual portions has been used and illustrated. A set of 9 photographs giving a visual impression of three different sizes of portions for 9 types of food items has been included. KMD

- 1143 TERPSTRA (AHM), BEYNEN (AC) and WEST (CE). The influence of type of protein in the diet on the serum cholesterol concentration in man and in animals. *Voeding*. 44(9); 1983; 308-13 (German)

It has been clearly demonstrated that in animals, dietary casein has a hypercholesterolemic effect, when compared to soya protein. But such an effect has not been observed in man. Thus, the type of dietary protein plays only a minor role in the regulation of serum cholesterol level in man. The possibility of a long-term effect, however, cannot be excluded. KMD

TOXICOLOGY AND HYGIENE

- 1144 THOUVENOT (D) and MORFIN (RF). Radioimmunoassay for zearalenone and zearalanol in human serum: Production, properties, and use of porcine antibodies. *Appl. Environ. Microbiol.* 45(1); 1983; 16-23

- 1145 UENO (Y), TASHIRO (F) and KOBAYASHI (T). Species differences in zearalenone-reductase activity. *Food Chem. Toxicol.* 21(2); 1983; 167-73

- 1146 SPICKETT (JT) and BELL (RR). The influence of dietary phosphate on the toxicity of orally ingested lead in rats. *Food Chem. Toxicol.* 21(2); 1983; 157-61

- 1147 EKWALL (B). Standardized cell culture methods for testing of acute toxicity. A new aid in toxicology. *Var Foda*. 35(2); 1983; 57-69 (Swedish)
- He La cells (a permanent cell line of human origin) have been used as indicators of basal functions common to all human cells, and of any acute toxicity caused by interference with these functions; in other words, they indicate cytotoxicity. Many chemicals in daily use may cause acute toxicity in man due to cytotoxicity. Hence a number of these chemicals - including 29 plasticizers, potato constituents, retinoids, and water samples - have been tested with He La cells. Fourteen drugs were also tested in He La cells and in primary cultures of rat liver cells. Four of the drugs were more toxic to liver cells than to He La cells. KMD
- 1148 SHIMADA (K), OHTSURU (M), YAMAGUCHI (T) and NIGOTA (K). Determination of tetrodotoxin by capillary isotachopheresis. *J. Food Sci.* 48(3); 1983; 665-7, 680
- 1149 CHARLES (RHG). Use of microbiological criteria for control of the safety of food. *Environ. Health*. 91(6); 1983; 142-5
- 1150 SHARMA (PL) and DOGRA (RC). *Bacillus cereus* enterotoxin and its production in different foods. *J. Food Sci. Technol.* (India) 20(5); 1983; 223-7
- Bacillus cereus* strain, B-4ac-L was grown on rice, bajra, soyabean, bread, Farex (baby food) and Banalona under aerated and stationary conditions and the production of enterotoxin was tested. Effect of pH (range 1-11) and salts (sodium chloride, sodium nitrite, sodium nitrate) on enterotoxin production by *B. cereus* strains (B-4ac-L, B-4ac and NCTC 2599) was also tested. Three test strains of *Bacillus cereus* synthesised enterotoxin in the early log phase; maximum activity was observed in late exponential phase. Culture filtrate from stationary phase did not reveal the presence of enterotoxin. The optimum pH range for production of enterotoxin was between 8.0 and 8.5 NaCl (1.5%) and NaNO₂ (1000 p.p.m.) inhibited the growth as well as enterotoxin production in strains B-4ac and B-4ac-L NaNO₃ above 2000 p.p.m. inhibited enterotoxin production, whereas the growth was not inhibited even at 3000 p.p.m. NaCl above 1.5% inhibited the growth of strain NCTC 2599 as well as production of enterotoxin, while NaNO₂ (upto 2000 p.p.m.) and NaNO₃ (upto 3000 ppm) had, no effect on the growth as well as production of enterotoxin. Rice and bajra supported the growth of B-4ac-L as well as production of enterotoxin, while bread, soyabean and the baby foods, Banalona and Farex supported growth, but failed to support production of enterotoxin. AA
- 1151 JOHN (L). *Clostridium perfringens* - food poisoning the potential hazards of atmospheric steam cookers. *Environ. Health*. 91(6); 1983; 147-9
- 1152 JONES (SB), PALUMBO (SA) and SMITH (JL). Electron microscopy of heat-injured and repaired *Staphylococcus aureus*. *J. Food Safety*. 5(3); 1983; 145-57
- 1153 KOTULA (AW), MURRELL (KD), ACOSTA-STEIN (L), LAMB (L) and DOUGLASS (L). Destruction of *Trichinella spiralis* during cooking. *J. Food Sci.* 48(3); 1983; 765-8
- 1154 EGUIAZU (GM) and FRANK (HK). Demonstration of aflatoxins in agricultural products: A simple method suitable for developing countries. *European J. App. Microbiol. Biotechnol.* 18(2); 1983; 128-30

A method which can be carried out easily for semi quantitative screening using a mini-column in combination with a fluorescence standard has been developed which is independent of time, temperature and light. KAR

- 1155 SANCHIS (V), VINAS (I), JIMENEZ (M) and HERNANDEZ (E). Rapid detection of aflatoxin producing *Aspergillus flavus* strains. *Rev. Agroquím Technol. Aliment.* 23(1); 1983; 54-9 (Spanish)

Suitability of two culture media - corn steep liquor-agar (APA and coconut agar (CAM) - for determining the aflatoxin production ability of strains of *A. flavus* has been investigated. 137 strains of *A. flavus* isolated from corn, have been tested. A conventional thin-layer chromatographic method for detection of aflatoxins is used as a reference. Using the reference method, 37 strains (27% of total) are aflatoxin producers. 36 of them give positive results with the CAM medium and only 29 with the APA medium. Both media can be used as a presumptive test for the screening of a large number of strains and as a complement to the TLC method. The CAM method is more precise than the APA, but, in both, negative results should be confirmed by the TLC method. AA

- 1156 HUGHES (DA) and BJELDANES (LF). Influence of selenium-supplemented torula yeast diets on liver-mediated mutagenicity of aflatoxin B₁. *J. Food Sci.* 48(3); 1983; 759-61

To determine the effect of dietary selenium on the mutagenicity of aflatoxin B₁ (AFB₁), male Sprague-Dawley rats were fed rat chow or Torula yeast diets supplemented with 0.0, 0.1, 0.5, 1.0, and 5.0 ppm Se as Na₂SeO₃, and the 9000 x g liver supernatants were used in *Salmonella*/microsome mutagenesis assays. The rats were fed on the diets for 4 weeks and, prior to killing, half the rats in each group received 80 mg phenobarbital/kg body weight in their drinking water for four consecutive days. Phenobarbital administration tended to increase the mutagenicity of AFB₁ in all dietary treatment groups. This increase was significant only in the chow-fed groups, however. Addition of selenium to the basal diet produced no significant effect on liver-mediated mutagenicity. The liver preparation from chow-fed animals which had received phenobarbital produced the highest mutagenicity of the samples tested. AA

- 1157 BICKING (MKL), KNISELEY (RN) and SVEC (HJ). Coupled-column system for quantitating low levels of aflatoxins. *J. Assoc. Off. Anal. Chem* 66(4); 1983; 905-8

The combination of Styragel and Florisil columns allows recovery of aflatoxins at low levels. Two switching valves between the columns reduce the analysis time and exposure to solvents. Florisil is modified with oxalic acid, allowing recovery of aflatoxins at levels below 500 pg. The method is useful for contaminated corn and peanut meal samples. AA

- 1158 HAYES (RB), Van NIEUWENHUIZE (JP), RAATGEVER (JW) and TEN KATE (FJW). Aflatoxin exposures in the industrial setting: An epidemiological study of mortality. *Food Chem. Toxicol.* 22(1); 1984; 39-43

GENERAL

- 1159 SURESH KUMAR (S) and ROHATGI (PK). Evaluation methods in R&D management. *J. Sci. Ind. Res.* 42(11); 1983; 591-3

- 1160 ANON. Abstracts of the 1984 IFT-IUFOST basic symposium papers. *Food Technol.* 38(3); 1984; 48-51

Abstracts cover: chemical changes in food during processing; chemistry of active oxygen species; metal catalysed reactions of organic compounds; free radical chemistry of natural products; mechanism of fatty acid and phospholipid oxidation; thermal and radiolytic decomposition of lipids; antioxidants; mechanisms of oxidoreductases important in food component modification; oxidation of tissue in biological tissue; oxidation induced changes in foods; modification of food components by hydrolytic enzymes; chemical reactions of proteins; non-enzymatic browning; pectin and cellulose changes during processing; vitamin changes during processing; natural pigments and food processing; environmental effects on protein quality and also chemical changes in foods. JVS

FOOD PROCESSING AND PACKAGING

PROCESSING

- 1161 RIZVI (SSH) and BENADO (AL). Thermodynamic properties of dehydrated foods. *Food Technol.* 38(3); 1984; 83-92

The review examines some of the basic aspects of food-water systems and provides a discussion on thermodynamic functions, assumptions made in their measurement and the methods for their profitable use in gaining on insight into some of the phenomenon occurring in food water systems. JVS

- 1162 MOHAN RAO (VN). Dynamic force-deformation properties of foods. *Food Technol.* 38(3); 1984; 103-9

Measurement of dynamic mechanical properties of foods is a relatively new technique characterises, by rapidity and minimal of physical/chemical changes. In addition mechanical properties can also be measured at various frequencies and temperatures. Methods of dynamic testing are divided into 4 groups. In this paper, theory and applications to foods of two methods, namely, direct measurement of stress and strain and resonance method have been discussed. JVS

- 1163 JOSEPHSON (ES). An historical review of food irradiation. *J. Food Safety.* 5(4); 1983; 161-90

Discusses: genesis; development; irradiation in USA (1946-80); other national food irradiation programs; international cooperation; and major events, 1980-82. BSN

- 1164 GIDDINGS (GG). Radiation preservation of foods: Substerilizing applications. *J. Food Safety.* 5(4); 1983; 191-202

Discusses: applications of radiation preservation in various foods; dosages of radiation employed; cost-pricing; packaging; and target bulk density. BSN

- 1165 MAXCY (RB). Significance of residual organisms in foods after substerilizing doses of gamma radiation: A review. *J. Food Safety*. 5(4); 1983; 203-11
Discusses; substerilizing irradiation; impact of radiation; resistance of microorganisms; temperature of irradiation; effect of mestrueum on survival of microorganisms; nature of death curve; nature of some unique bacteria surviving substerilizing irradiation; acquired resistance; source of highly radiation-resistant vegetative cells; mutants as source of residual organisms in foods; temperature requirements for growth of radiation-resistant bacteria; and public significance of the surviving flora. BSN
- 1166 WELT (MA). A unique and versatile gamma irradiator for radiation preservation of food. *J. Food Safety*. 5(4); 1983; 229-41
Discusses: background; design considerations for an irradiation (sprout inhibition, insect disinfestation, shelf life extension and pathogen elimination, sterilization); good manufacturing practice; operational experience; case studies on economic aspects of use of RT-4101 type irradiator for insect disinfestation of grapefruit; sprout inhibition in potato, poultry or finfish radurization; radappertization of food sterilization or medical product and reactor component test irradiation. BSN
- 1167 TAKEGUCHI (CA). Regulatory and toxicological aspects of food irradiation. *J. Food Safety*. 5(4); 1983; 213-7
Discusses: legal and regulatory aspects; toxicological aspects, and current status. BSN
- 1168 TITLEBAUM (LF) and DUBIN (EZ). Will consumers accept irradiated foods: *J. Food Safety*. 5(4); 1983; 219-28
Discusses: methods (focus group research to qualitative assessment; questionnaire (self administered) for assessing consumer preference of freshness); results (focus group general perceptions of freshness, reaction to process of irradiation, specific concerns about irradiation; response to terms "irradiated foods" or "processed by ionizing energy", information consumers desire before purchasing irradiated food; would consumers buy them); stop and shop questionnaire; consumer network questionnaire results; and discussion. BSN

PACKAGING

- 1169 ANON. General view on good packages in Japan. *Packag. Jpn.* 4(14); 1983; 21-8
- 1170 ISHITANI (T). The present state and future trend of the test and research on food packaging in Japan. *Packag. Jpn.* 4(14); 1983; 36-41
- 1171 ANON. Future development of the metallized packaging market in Japan. *Packag. Jpn.* 4(14); 1983; 29-30
- 1172 ANON. Aseptic efforts focus on plastic, cup-style packs. *Packag. Eng.* 28(1); 1983; 63-8
Discusses: sealing technique; container cost is incentive; thermoforms and labels cups; five larger co-extrusions and; oxygen barrier. BSN

- 1173 ITO (KA) and STEVENSON (KE). Sterilisation of packaging materials using aseptic systems. *Food Technol.* 38(3); 1984; 60-62
 An aseptic packaging system has to ensure sterility of the product, container and the environment in order to produce a commercially sterile product. Currently available aseptic packaging methods can be broadly distinguished are: superheated steam systems, dry hot air systems, hydrogen peroxide systems and systems utilising heat of coextrusion process for sterilisation. The test organisms of choice for different systems are as follows: *Bacillus stearothermophilus* 1518 or *B. polymyxa* for systems using super heater steam; and *B. subtilis* A and *B. subtilis* (Globiger) for systems using H_2O_2 with heat or adjuncts. For radiation sterilisation of packages *B. subtilis* has been used as test organism. JVS
- 1174 FIGGE (K), BIEBER (W-D) and KLAHN (J). Examination and evaluation of an organotin stabilizer for the production of rigid PVC blown films for food. *Dtsch. Lebensmittel-Rundschau.* 79(3); 1983; 69-79 (German)
- 1175 MARSH (KS). Computer simulation speeds shelf life assessments. *Packag. Eng.* 28(1); 1983; 72-3
 The system designed for moisture-sensitive products correlates product characteristics with performance of packaging material. BSN
- 1176 BERTRAND (K). Speedy labeler 'dresses up' salad-dressing line. *Packag. Eng.* 28(1); 1983; 78-9
- 1177 GYLYS (RB) and RIZVI (SSH). A simple nondestructive method for determination of air-content in polymeric packages. *J. Food Sci.* 48(5); 1983; 1560-61
- 1178 SIDHANTY (AR). Packaging of snack foods. *Perfectpac.* 23(3); 1983; 23-7
- 1179 VARNER (SL), BREDER (CV) and FAZIO (T). Determination of styrene migration from food contact polymers into margarine, using azeotropic distillation and headspace gas chromatography. *J. Assoc. Off. Anal. Chem.* 66(5); 1983; 1067-73

FOOD ENGINEERING AND EQUIPMENT

- 1180 OHKAWA (A), YUZAWA (T) and SAKAI (N). Effect of disk diameter on the foam-breaking capacity of a mechanical foam-breaker with a rotating disk. *J. Ferment. Technol.* 61(5); 1983; 483-9
 The results showed that the effective lower and upper limits of the disk diameter were approximately 50% and 80% of the vessel diameter respectively, regardless of the operating conditions of the aerated vessel. KAR
- 1181 CORRIEU (G), MAINGONNAT (JF) and FERRET (R). An industrial viscosimeter for the continuous characterization of highly viscous food products. *Ind. Aliment. Agric.* 100(4); 1983; 235-40 (French)
 An industrial flow-viscosimeter has been developed, which is based on Hagen-Poiseuille's law, as extended to non-Newtonian products. At a constant flow rate, a pressure drop measurement is sufficient to estimate the apparent viscosity of the product. The authors have also made a study to

ensure that the viscosimeter can be cleaned in its place (or on-line). Some examples of applications to industrial food processes have been presented. KMD

ENERGY IN FOOD PROCESSING

- 1182 CHANDRA (M). Energy development - quality of life. Twelfth congress of the World Energy Conference. *J. Sci. Ind. Res.* 42(11); 1983; 594-6

FOOD CHEMISTRY AND ANALYSIS

- 1183 JAGERSTAD (M), REUTERSWARD (AL), OLSSON (R), GRIVAS (S), NYHAMMAR (T), OLSSON (K) and DAHLQVIST (A). Creatin(in)e and maillard reaction products as precursors of mutagenic compounds: Effects of various amino acids. *Food Chem.* 12(4); 1983; 255-64
- 1184 WESTPHAL (G) and KROH (L). Investigation on the Maillard reaction. Part IX. Volatile reaction products from the reaction of glucose with thiourea. *Nahrung.* 27(2); 1983; 177-81 (German)
- 1185 BATEY (IL) and GRAS (PW). Preparation of salt-free protein products from acid or alkali-treated proteins. *Food Chem.* 12(4); 1983; 265-73
Casein has been used in this study for neutralizing the alkaline hydrolysates of gluten. Neutralization with acidic proteins resulting from the deamidation of gluten has also been studied. This paper describes the feasibility of using these proteins, as well as basic proteins such as salmine for the neutralization of hydrolysates of gluten. KAR
- 1186 LOZANO (JE), ROTSTEIN (E) and URBICAIN (MJ). Shrinkage, porosity and bulk density of foodstuffs at changing moisture contents. *J. Food Sci.* 48(5); 1983; 1497-502, 1553
Dependable data on bulk density, volumetric shrinkage due to water loss and porosity are needed to model processes such as drying, packaging and storing. Experimental data are presented for all three properties. It is possible to model the water-loss-based bulk shrinkage coefficient to obtain a predictive equation based on composition of the foodstuff. From this, a generalized correlation is obtained which predicts bulk shrinkage coefficient knowing only the initial moisture content of the food. Porosities for the foodstuffs considered can be predicted through suitable correlations, but there is no generalized equation spanning all foods. AA
- 1187 GOULD (JH), BUTLER (SW) and STEELE (EA). Release of lead and cadmium: comparison of two hot leach methods with a room temperature method, using specially glazed ceramic ware. *J. Assoc. Off. Anal. Chem.* 66(5); 1983; 1112-6

The two hot leach methods (oven and hot plate leach) released 7 to 11 times more Pb and 6 to 10 times more Cd from glazed ceramic cookware after 24 hours than AOAC procedure. Both methods involve treatment with boiling 4% acetic acid for 2 hours, followed by cooling for 22 hours at room temperature. Almost all of Pb and Cd are found to be released in 2 hours. Hot plate method is less difficult and gives continuous refluxing action. JVS

- 1188 TROLLER (J). Methods to measure water activity. *J. Food Prot.* 46(2); 1983; 129-34

Different methods and principles of water activity have been reviewed. Data on performance of methods, advantages and disadvantages of various procedures have been reported and discussed. BSN

- 1189 JAKOBSEN (M). Filament hygrometer for water activity measurement. An interlaboratory evaluation. *J. Assoc. Off. Anal. Chem.* 66(5); 1983; 1106-111

An interlaboratory evaluation of the method for a_w was carried out for Nordic Committee on Food Analysis; measurements were possible, by using filament hygrometer, with a reproducibility of 0.005 and 0.010 a_w respectively. The parameters critical to a_w measurements regardless of method and instruments have been discussed. JVS

- 1190 LANGE (R), FRIEBE (R) and LINOW (F). On the use of the Kjeldahl wet digestion/BERTHELOT reaction combined method for determining nitrogen in biological materials. Part V. Possibilities and limits of the simultaneous ashing of biological materials of different origin and variable chemical composition. *Nahrung.* 27(2); 1983; 191-204 (German)

- 1191 GOSSETT (PW), RIZVI (SSH) and BARKER (RC). A new method to quantitate the coagulation process. *J. Food Sci.* 48(5); 1983; 1400-404

A nondestructive method to quantitate the coagulation process has been developed and used to obtain kinetic data on the heat-induced gelation of egg albumen. It involves continuous monitoring of the force exerted by the gel as coagulation takes place and requires only one sample to observe the total process. From the information on the maximum force exerted by the gel, rate constants, Z values, and activation energies were calculated. This approach was applied to evaluate other coagulation processes such as the enzymatic coagulation of milk and the gelation of gelatin by cooling. AA

- 1192 GRIFFITHS (NM) and BILLINGTON (MJ). A note on the adaptation of a laboratory high pressure liquid chromatograph for the determination of specific peptides in food stuffs. *J. Assoc. Public Anal.* 21(3); 1983; 89-92

High pressure liquid chromatography (HPLC) has been used for determining peptide profiles of trypsin digests from soya/meat mixes by using post column derivatisation. BSN

- 1193 KUMPULAINEN (J), RAITTILA (A-M), LEHTO (J) and KOIVISTOINEN (P). Electrothermal atomic absorption spectrometric determination of selenium in foods and diets. *J. Assoc. Off. Anal. Chem.* 66(5); 1983; 1129-35

Two ETAAS methods were tested, by using 0.5% Ni(II) to prevent selenium losses during ashing step. Selenium could be determined in samples containing ≥ 1 mcg Se/g (dry weight) without organic extraction. The recovery using NBS bovine liver was 98% and of added inorganic selenium 100%. By using inorganic ^{75}Se in human milk and meat matrix, an ammonium pyrrolidine dithiocarbamate-methylisobutyl ketone-extraction system with Cu(II) as a matrix modifier gave recoveries of 97 and 98% respectively. Detection limit of the method was 3 ng Se/g dry weight for 1 g dry weight. JVS

- 1194 PAGE (BD) and CHARBONNEAU (CF). Determination of acrylonitrile in foods by headspace gas-liquid chromatography with nitrogen-phosphorus detection. *J. Assoc. Off. Anal. Chem.* 66(5); 1983; 1096-105

The method is for determining acrylonitrile (AN) in fatty foods likely

to be packed in AN-based plastics. Samples are blended at ≤ 5 C with water and salt, sealed in vials and equilibrated in boiling water. The headspace in vial is sampled by a heated syringe and AN is determined by GC with N-P selective detector. The quantity of AN determinable in margarine, honey butter, and cold-pork cheese and peanut butter is 4,4,10 and 15 ppb respectively. JVS

- 1195 TANNERT (U). Identification of tenside types in aqueous solutions. *Dtsch. Lebensmittel Rundschau*. 79(3); 1983; 91-2

A simple method of distinguishing between anion-active and cation-active tensides has been described and discussed. It is based on paper-chromatographic elution of ion-pairs of tensides with opposite-charged, coloured ions. KMD

FOOD LAWS AND REGULATIONS

Nil

FOOD MICROBIOLOGY

- 1196 MURPHY (RP). The estimation of viable count in the control of quality in food manufacture. *J. Food Technol.* 18(6); 1983; 801-4

- 1197 SAHU (BR) and TANDON (U). A novel method for spot test detection of alcohols. *J. Indian Chem. Soc.* 60(6); 1983; 615-616

The violet complex of vanadium N-phenyl-benzohydroxamate in a chloroform solution is strikingly susceptible to traces of alcohols. Micro-quantities of alcohols change the colour of the complex from violet to a pale yellow finally. Based on this observation, a method has been developed for the analysis of several mono- and poly-hydric alcohols used in pharmaceutical and other samples. The limits of detection, with the vanadium complex, are the same as by other existing methods. KMD

- 1198 SCHMIDT (RH), DAVIDSON (SM) and BATES (RP). Acetaldehyde determination in fermented food products by direct 2,4-dinitrophenylhydrazine derivatization, extraction and high performance liquid chromatography. *J. Food Sci.* 48(5); 1983; 1556-7

Data obtained for acetaldehyde analysis of yoghurt and wine by direct 2,4-dinitrophenylhydrazine (DNPH) derivatization and extraction are compared to those obtained by distillation and DNPH derivatization. Separation and analysis of acetaldehyde 2,4-dinitrophenyl-hydrazone (DNP) was by reverse phase high performance liquid chromatography (HPLC). Higher precision was obtained with the direct derivatization extraction technique than for the distillation derivatization technique. Data obtained by the direct derivatization extraction technique for acetaldehyde in commercial yoghurt samples had less variability than those for wine. AA

BACTERIA

- 1199 HATTORI (T). Further analysis of plate count data of bacteria. *J. Gen. Appl. Microbiol.* 29(1); 1983; 9-16

YEAST

- 1200 BEUCHAT (LR). Influence of water activity on growth, metabolic activities and survival of yeasts and molds. *J. Food Prot.* 46(2); 1983; 135-41
Discusses: adaptation to reduced a_w ; sporulation; germination of spores; effects of a_w on survival; influence of a_w on mycotoxin production; and enumeration of fungi. BSN
- 1201 MUAYAD (A), HALASZ (A), MATRAI (B), SZALMA-PFEIFFER (I). Efficiency of different mutagenic treatments and the protoplast fusion technique in producing methionine-rich mutants from yeasts. *Acta Aliment.* 12(3); 1983; 211-21

MUSHROOM

- 1202 McCORD (JD) and KILARA (A). Control of enzymatic browning in processed mushrooms *Agaricus bisporus*. *J. Food Sci.* 48(5); 1983; 1479-83
Control of polyphenol oxidase (E.C.1.14.18) activity by the use of citric acid was investigated. The enzyme was inactivated at pH 4.0 and was stable to 10 minutes exposures at 25 C in the pH range 4.0-8.0. At pH 6.5 the enzyme was active at 45 C but not at 70 C and thermal inactivation followed pseudo first-order kinetics. At pH 6.5 the activation energy (E_a) for enzyme inactivation was 41.1 Kcal/mole, while at pH 3.5 two rate constants and hence two values for E_a were observed. Between 0-5 minutes, E_a for inactivation of polyphenol oxidase was 8.7 Kcal/mole and >5 minutes E_a was 21.8 Kcal/mole. AA
- 1203 SEEGER (R), TRUMPF HELLER (S) and SCHWEINSHAUT (P). Occurrence of sodium in mushrooms. *Dtsch. Lebensmittel Rundschau.* 79(3); 1983; 80-87
The sodium content of 465 species (1248 samples) of wild European fungi, including both edible and poisonous types, was determined by AAS in an air/acetylene flame, and found to range between <15 (below the detection limit) to 4450 mg/kg dry weight. In about 50% of the samples, it lay between 100 and 400 mg/kg dry weight (equivalent to <1.5 and 429 mg/kg fresh weight, respectively). The Na content of fungi, was about 0.91% of the K-content, and was very well correlated with K-content ($r = +0.127$; $p < 0.001$; $n = 1032$). In single fruit bodies of 10 species, the Na-content was lowest in the gills. *Agaricus bitorquis* was the species that had the highest Na-content. The family Coprinaceae had, the highest Na-content, while Na-content was above average in the families Amanitaceae, Agaricaceae, Strophariaceae, and Cortinariaceae. Very little Na was found in the Polyporaceae. Twelve samples of soil, or litter, contained 95-375 mg Na per kg dry weight (142 ± 23 mg/kg; $\bar{x} \pm S.E.$). Thus, mushrooms rank among the vegetables having the lowest sodium content. KMD

FOOD ADDITIVES

- 1204 MATHEWS (RA) and STEWART (MR). Report summarises data from food additive surveys. *Food Technol.* 38(3); 1984; 53-8

The summary report covers most direct food additives, including colorants; it however, does not include residues of agricultural chemicals used in food production and indirect additives, namely those that migrate into food from packaging materials. Definitions of different processing additives and final product additives have been provided. The limitations in the data with reference to the scope, and intake estimates, have been mentioned. In spite of these limitations, it is felt that the summary report provides the most accurate and complete data on the use of food additives in U.S. JVS

- 1205 SASTRY (DS) and SHENDE (MW). Status of food grade antioxidants in India. *Indian Food Packer.* 37(5); 1983; 39-49

Aspects covered include, nature of antioxidants, food antioxidants, synergism, functions of antioxidants, the Indian scene, BHA, BHT, propyl gallate, tertiary hydroquinones, applications and methods of application, tests and socio-economic aspects. BSN

- 1206 PETHYBRIDGE (AD), ISON (RW) and HARRINGAN (WF). Dissociation constant of sorbic acid in water and water-glycerol mixtures at 25 C from conductance measurements. *J. Food Technol.* 18(6); 1983; 789-96

- 1207 PELEG (M) and HOLLENBACH (AM). Flow conditioners and anticaking agents. *Food Technol.* 38(3); 1984; 93-102

The principal food grade conditioners are silicon dioxide, phosphates, salts of stearic acid, talcum starches and modified carbohydrate. They are added into host powders to improve their flow properties and also prevent caking. Two tables provided in the text, give the regulatory status and profiles of selected conditioners. A comprehensive discussion on the mode of activity (physical separation, interruption of liquid bridging, lubrication, competition for absorbed water, cancellation of electrostatic charges and molecular forces) and modification of crystalline lattice of conditioners, methods for evaluating their effectiveness, and effect of concentration of conditioners. JVS

- 1208 LEAHY (MM), ANANDARAMAN (S), BANGS (WE) and REINECCIUS (GA). Spray drying of food flavours. II. A comparison of encapsulating agents for the drying of artificial flavours. *Perfum. Flavor.* 8(5); 1983; 49-56

The study has revealed that the five best carrier systems (microcap, National 4b, Nadex 772, Encapsol 855, Nockrend gum Arabic) with total solids ranging from 33-50 showed retention values of 75-91% of artificial flavour mixture (equal weights of diacetyl, ethyl acetate, ethyl propionate, ethyl isobutyrate, ethyl butyrate, butyl acetate, 2-heptanone, ethyl valerate, benzaldehyde, ethyl hexanoate, acetophenone, linalool, phenyl ethyl alcohol, benzyl acetate, alpha-terpineol, methyl salicylate, 1-carvone, methyl anthranilate, vanillin, eugenol, ionone and ethyl methyl phenyl glycidate). BSN

- 1209 McCORMICK (RD). Food pigment use governed by broad considerations. *Process. Prep. Food.* 152(1); 1983; 127, 131-2

The brief review covers the major colourants (annatto and annatto extracts caramel, paprika), while mention has been made of other colourants, which may also play an important role in food processing. BSN

- 1210 RUBACH (K) and OFFIZORZ (P). Detection of sweeteners, saccharin and cyclamate by means of capillary isotachophoresis. *Dtsch. Lebensmittel Rundschau*. 79(3); 1983; 88-90

Saccharin and cyclamate move as anions in an electrical field, and can be separated from other interfering substances in foods by capillary isotachophoresis. The width of the UV signal at 254 nm is directly proportional to the amount of saccharin, while the length of the conductivity step provides quantitative information about the concentration of cyclamate. Saccharin and cyclamate contents of a number of dietetic foods, beverages, and condiments have been reported. The average rate of recovery is about 99% in the isotachophoretic separation. The coefficient of variation for 5 determinations is 2%. One determination can be carried out in 15 minutes. KMD

CEREALS

- 1211 JACOBSEN (T) and SLOTFELDT-ELLINGSEN (D). Phytic acid and metal availability: A study of Ca and Cu binding. *Cereal Chem.* 60(5); 1983; 392-5

- 1212 HAUG (W) and LANTZSCH (H-J). Sensitive method for the rapid determination of phytate in cereals and cereal products. *J. Sci. Food Agric.* 34(12); 1983; 1423-6

A rapid method is described for the colorimetric determination of 1.5-15 µg phytate phosphorus in concentrations as low as 3 µg ml⁻¹ in extracts of cereal grains and cereal products. The phytic acid is precipitated with an acidic iron-III-solution of known iron content. The decrease of iron in the supernatant is a measure for the phytic acid content. AA

- 1213 ENGLYST (HN), ANDERSON (V) and CUMMINGS (JH). Starch and non-starch polysaccharides in some cereal foods. *J. Sci. Food Agric.* 34(12); 1983; 1434-40

The method described allows accurate determination of plant cell wall and other plant polysaccharides and identification and measurement of starch made resistant to digestion by α-amylase and pullulanase during food processing. KAR

- 1214 WARCHALEWSKI (JR). Present day studies on cereals protein nature alpha-amylase inhibitors. *Nahrung*. 27(2); 1983; 103-17

RICE

- 1215 TAINSH (JAR) and BURSEY (EC). Advantages of cold milling for long grain rice. *World Crops*. 35(4); 1983; 155; 156-58

A review dealing with aspects like hot milling, Engleberg single-stage hot mill, reputed causes of broken in hot milled rice, cold milling, cold polishing, 'Taibur' cold huller and polisher for paddy, and commercial viability of cold milling. KAR

WHEAT

- 1216 YAMAZAKI (WT) and DONELSON (JR). Kernel hardness of some U.S. wheats. *Cereal Chem.* 60(5); 1983; 344-50

- 1217 JENSEN (SA) and LAW (DP). A rapid method for the detection of sprouting in populations of wheat kernels. *Cereal Chem.* 60(5); 1983; 406-7
 The simple fluorescence technique outlined, allows the visualisation of hydrolase activity in the endosperm of germinated wheat kernels by the use of a lipase-sensitive fluorescence. BSN

- 1218 WECKWERTH (C) and HANDRECK (B). Rheologic properties of the wheat kernel. *Lebensmittel-industrie* 30(1); 1983; 32-4 (German)

A general description has been given of the rheological tests that have been conducted hitherto on wheat kernels, and a conceptual model of the rheological behaviour has been presented. Some indications have been given of the rheological behaviour of the wheat variety, "Aleeds", have been and of the relationship between the rheological properties and kernel strength and elasticity. KMD

- 1219 TOGNAZZA (B). Reduction of filth in cereal processing. *Gordian*. 83(6); 1983; 121-122 (German)

The filth content - i.e. insect fragments and animal excrements - of cereals, especially wheat, can be considerably reduced by making the grain strike with force against a metal wall, and aspirating away the powdered (or light) filth. If the "concentrator" classifier which separates out perforated grains - is used, the quantity of wheat to be impacted can be greatly reduced, and bad grain and filth separated out at the same time. Thus, the use of impact and aspiration machines will help the miller to produce hygienic products. KMD

- 1220 DONOVAN (JW), LORENZ (K) and KULP (K). Differential scanning calorimetry of heat-moisture treated wheat and potato starches. *Cereal Chem.* 60(5); 1983; 381-7

- 1221 KLEIN-SCHIPHORST (HAJ). The "feedback" system, or continuous moisture determination of tempered wheat. *Getreide Mehl Brot*. 37(3); 1983; 80-84 (German)

Up till now, moisture in grain could be assessed only by the "feed forward" system; i.e. to say, the initial moisture content was measured and a calculated quantity of water was added to bring the moisture content of the grain to the desired level. Now, the moisture content of freshly wetted grain can be measured with the help of micro-waves, and any deviation from the pre-specified value corrected. In this way, the moisture content can be controlled within a range of $\pm 0.1\%$. KMD

- 1222 GRAVELAND (A). Analysis and functional properties of cereal proteins. *Getreide Mehl. Brot*. 37(3); 1983; 70-74 (German)

Analysis of cereal proteins has revealed that wheat contains relatively large amounts of glutenine I and gliadine, and very little of gluteline. The bread-making quality of wheat depends on these two components, as glutenine I imparts the necessary elasticity to the protein network (Lattice) that is formed, while gliadine imparts the necessary viscosity. The quality of the protein - which is genetically determined, to a great

extent - depends upon the chemical properties of glutenine I; it may be attributed to the A-aggregations which act both as links, as well as the major components of the BC- and Gl-aggregations. After the elucidation of the oxidation-reduction mechanism of glutenine I, it has become possible to gain an insight into the role of oxidative flour improvers. KMD

- 1223 BEKES (F), ZAWISTOWSKA (U) and BUSHUK (W). Protein-lipid complexes in the gliadin fraction. *Cereal Chem.* 60(5); 1983; 371-8
- 1224 BEKES (F), ZAWISTOWSKA (U) and BUSHUK (W). Lipid-mediated aggregation of gliadin. *Cereal Chem.* 60(5); 1983; 379-80
- 1225 KULP (K), ROEWE-SMITH (P) and LORENZ (K). Preharvest sprouting of winter wheat. I. Rheological properties of flours and physicochemical characteristics of starches. *Cereal Chem.* 60(5); 1983; 355-9
Field sprouting of wheat resulted in gradual weakening of doughs (mixograph) and had little effect on mixing time and absorptions. Amylograph peak viscosities decreased with decreasing falling number values. Sprouting did not affect solubility, swelling powers, viscogram indices and gelatinization temperature ranges. However, sprouted wheat showed higher water binding capacity than control wheat. BSN
- 1226 LORENZ (K), ROEWE-SMITH (P), KULP (K) and BATES (L). Preharvest sprouting of winter wheat. II. Amino acid composition and functionality of flour and flour fractions. *Cereal Chem.* 60(5); 1983; 360-66
Baking potential of flours was reduced in preharvest wheats due to increase in α -amylase and protease contents. Excessive α -amylase led to stickiness of dough, resulting in poor handling and machining properties during bread making. High level of protease influenced gluten properties adversely whereby the loaf volume of resulting bread was poor internal quality. Sprouting also affected thickening powers of starches from soft wheat flour. BSN
- 1227 SEILER (K) and SCHUY (A). Testing the baking capacity of extruded wheat flours - physical-rheological investigation of wheat flours. *Gordian.* 83(6); 1983; 126-131 (German)

RYE

- 1228 WEIPERT (D) and ZWINGELBERG (H). Infra-red treatment of rye. *Getreide Mehl Brot.* 37(3); 1983; 75-80 (German)
Rye samples of varying grain quality were treated in a micronizer which had six, gas-heated, infra-red radiators. The samples were wetted to different extents, in order to vary the intensity of the IR-irradiation. Two types of treatment were applied: a mild one, to reduce enzyme activity, and an intensive one to produce drastic changes in the structure and behaviour of the constituents of the grain. The mild treatment produced an increase in the fall index and in the amylogram. The effect of IR-irradiation on the maximum viscosity increased with the degree of wetting of the grain (or grain moisture) and with the duration of irradiation. The temperature of maximum gelatinization also increased by 8.5 C. The baking quality of a grain lot affected by sprouting, could be improved best by raising its temperature to 80-95 C. The thermal effect is all the greater as the quantity of wetting water increases, and the water penetrates further into the grain. KMD

MILLETS

SORGHUM

- 1229 EARP (CF), DOHERTY (CA) and ROONEY (LW). Fluorescence microscopy of the pericarp, aleurone layer, and endosperm cell walls of three sorghum cultivars. *Cereal Chem.* 60(5); 1983; 408-10

MAIZE

- 1230 CICUTTINI (A), KOLLACKS (WA) and REKERS (CJN). Reverse osmosis saves energy and water in corn wet milling. *Starch.* 35(5); 1983; 149-54

- 1231 CZAJA (Th). Two kinds of starch grains in ripe maize seeds? *Starch.* 35(5); 1983; 155-6 (German)

Maize seed in the unripe spadix contain only optically active starch granules like those in the horny endosperm. But as the scutellum and the embryo develop, the starch granules in the immediate neighbourhood of these organs are decomposed by fermentation. That is how one obtains in the interior of the maize seed the so-called floury endosperm which is an optically inactive residue. KMD

- 1232 HOGEN (ML). Detection of phosphorus on starch by atomic absorption and the graphite furnace. *Cereal Chem.* 60(5); 1983; 403-5

GFAA (Graphite Furnace Atomic Absorption) determination of phosphorus in corn starch and potato starch in both dry and paste state gave values well within amounts known to be added to starches. With GFAA technique, there is no need for digestion with perchloric acid to convert the various phosphate forms into orthophosphate. The technique involves acid hydrolysis (4N-hydrochloric acid) of starch samples and addition of 0.2% nickel instead of 1-2% lanthanum, to stabilize phosphorus during heating, as nickel gives equal sensitivity at a lesser cost than lanthanum. BSN

- 1233 WU (YV), PAULIS (JW), SEXSON (KR) and WALL (JS). Conformation of corn zein and glutelin fractions with unusual amino acid sequence. *Cereal Chem.* 60(5); 1983; 342-4

- 1234 GARCIA (WJ), CAVINS (JF), INGLET (GE), HEAGLE (AS) and KOWLEK (WF). Quality of corn grain from plants exposed to chronic levels of ozone. *Cereal Chem.* 60(5); 1983; 388-91

Compositional changes in corn obtained from plants treated earlier with ozone from 0.2-0.15 ppm and in the second phase at three levels (0.02, 0.06, 0.15 ppm) were minor for protein, amino acids, fat, fiber, ash, starch and amylose in starch. With an increase in ozone content; levels of Zn, Fe, Cu and methionine showed a significant increase. Three corn types behaved differently to the same levels of ozone exposure. BSN

- 1235 WHITAKER (TB) and DICKENS (JW). Evaluation of a testing program for aflatoxin in corn. *J. Assoc. Off. Anal. Chem.* 66(5); 1983; 1056-8

The objective of this paper is to ascertain the risk for processors and consumers when corn meal is tested for aflatoxin by a sampling procedure (described in the paper) adopted by N. Carolina Department of Agriculture (NCDA). A computer model simulating this testing programme was

developed and evaluated by application to a hypothetical model of 1000 corn meal with the same distribution of aflatoxin concentrations as was observed in NCDA programme. A decision part or for 94% of the time was arrived at; the risks for processors and consumers were 7.3% and 1.0% respectively. JVS

BARLEY

- 1236 ABRAMSON (D), SINHA (RN) and MILLS (JT). Mycotoxin and odour formation in barley stored at 16 and 20% moisture in Manitoba. *Cereal Chem.* 60(5); 1983; 350-55

PULSES

BLACK GRAM

- 1237 PRUTHI (JS), MANAN (JK), KALRA (CL) and RAINA (BL). Studies on the manufacture, packaging and storage of traditional savoury foods. Part I. Black gram (urad) and green gram (mung) wadian. *Indian Food Packer.* 37(5); 1983; 61-70

Optimum conditions for manufacture, packaging and storage of (a) black gram (urad) and (b) green gram wadian (a traditional savoury product) have been determined. Of the five antimicrobial agents investigated (i) parahydroxy benzoic acid, (ii) potassium sorbate, (iii) potassium propionate, (iv) sodium benzoate and (v) potassium metabisulphite each at 0.01% concentration, (v) was found most effective in lowering the microbial load as well as for improving colour of the final product. ERH studies have shown that the values were 59.3 and 58.6% for (a) and (b) respectively. LDP bags of 300 and 400 gauge were found satisfactory for packaging of (a) and (b) for storage at RT (13-42 C, RH 30-90%) for 10 months. BSN

CHICK PEA

- 1238 EL FAKI (HA), DESIKACHAR (HSR), PARAMAHANS (SV) and THARANATHAN (RN). Carbohydrate make-up of chick pea, cow pea and horse gram. *Starch.* 35(5); 1983; 163-6

- 1239 EL FAKI (HA), BHAVANISHANKAR (TN), THARANATHAN (RN), and DESIKACHAR (HSR). Flatus effect of chick pea (*Cicer arietinum*), cow pea (*Vigna sinensis*) and horse gram (*Dolichos biflorus*) and their isolated carbohydrate fractions. *Nutr. Rep. Int.* 27(5); 1983; 921-9

Results of *in vitro* and *in vivo* studies indicated that apart from oligosaccharides, both the starch and hemicelluloses contributed substantially to the total flatulence effect of chick pea, cow pea and horse gram. Gas chromatographic analysis of the resulting flatus gases revealed significant amounts of hydrogen (55-60%), followed by carbondioxide (35-40%) and small amounts of undetected gases. Among the various processing methods employed for preparing a product from chick pea with low flatulence, roasting or boiling were ineffective. Fermentation reduced the flatulent effect markedly. Removal of oligosaccharides and hemicelluloses by preliminary water soaking and sieving followed by precipitation of protein gave a product which was significantly nonflatulent. AA

COW PEA

- 1240 McWATTERS (KH). Compositional, physical and sensory characteristics of Akara processed from cow pea paste and Nigerian cow pea flour. *Cereal Chem.* 60(5); 1983; 333-6

Akara (deep fat fried balls) processed from cow pea *Vigna unguiculata* and from soaked, but not dehulled cream peas (Dixicream cultivars) was compared to traditionally prepared akara. The paste consistency was too fluid to dispense properly as balls and hence the akara obtained were mis shaped. Uncooked Dixicream paste was darker (L=74.8) and greener (a= -6.3) as compared to reference paste (L = 77.7; a = -3.7). As such, the akara obtained turned brown during frying (L = 61.7). Flour based akara with whole egg had a protein content of 19.3 as against 16.1% for reference and 17.3% for Dixicream akara. Greater force (27.7623 N/g) was required to shear flour based akara as compared to akara from Dixicream (17.0694 N/g) and reference (16.9173 N/g). Sensory characteristics of akara obtained from all treatments were highly acceptable, except that in case of flour based akara, they were dry, tough and had beany flavour. BSN

- 1241 OLOGHOBO (AD) and FETUGA (BL). Investigations on the trypsin inhibitor, hemagglutinin, phytic and tannic acid contents of cow pea *Vigna unguiculata*. *Food Chem.* 12(4); 1983; 249-54

Ten cultivated varieties of cow pea were analysed and the values are reported. Considerable variability in hemagglutinating activity was evident among the different varieties. KAR

DRY BEAN

- 1242 DESHPANDE (SS), SATHE (SK) and CHERYAN (M). *In vitro* proteolytic digestibility of dry bean (*Phaseolus vulgaris* L.) protein concentrates. *Nutr. Rep. Int.* 27(5); 1983; 931-6

In vitro protein digestibility of native and heated suspension of dry bean protein concentrates was investigated. Moist heating upto 30 minutes improved the *in vitro* protein digestibility. Trypsin digestion, expressed as TCA-soluble nitrogen released, suggested Light Red Kidney bean proteins to be more resistant to *in vitro* proteolysis than those of the other cultivars investigated. Electrophoresis of tryptic digests indicated the resistance of major storage proteins of beans to *in vitro* proteolysis. AA

GREEN BEAN

- 1243 MASSEY (LM) Jr. Nutritive quality of long-distance shipped green beans for processing. *J. Food Sci.* 48(5); 1983; 1564-5
- 1244 BASEL (RM). The improvement of green colour of green beans by acidified bulk storage. *J. Food Technol.* 18(6); 1983; 797-9

LENTIL

- 1245 DAGHIR (NJ), SELL (JL) and MATEOS (GG). Effect of gamma irradiation on nutritional value of lentils (*Lens culinaris*) for chicks. *Nutr. Rep. Int.* 27(5); 1983; 1087-93

Irradiation of lentils did not change the crude protein, but solubility of lentil protein was reduced by irradiation. Chick growth studies indicated that irradiation improved the nutritive value of lentils slightly. Irradiation tended to improve the nitrogen retention by chicks fed lentils and significantly increased the metabolizable energy value of lentil. KAR

OILSEEDS AND NUTS

RAPESEED

- 1246 SCHWENKE (KD), RAAB (B) and DAMASCHUN (G). The structure of the 12S globulin from rapeseed (*Brassica napus* L.). *Nahrung.* 27(2); 1983; 165-75

SOYABEAN

- 1247 URBANSKI (GE), WEI (LS), NELSON (AL) and STEINBERG (MP). Rheology models for pseudoplastic soy systems based on water binding. *J. Food Sci.* 48(5); 1983; 1436-9

The objectives were to (1) determine the effects of sucrose, glucose, sodium chloride and soy soluble carbohydrate on flow characteristics of suspensions of polymers, and (2) investigate the relationship between these effects and the quantity of water associated with polymer and solute in the suspension. Polymers were defatted soy flour, soybean sodium proteinate and soybean cell wall material. A strong linear relationship was developed between the ratio of polymer and polymer bound water to solute and solute bound water (P/S) and flow characteristics. The models developed from these relationships held for soy flours containing both polymer and solute. Suspensions with high P/S showed a high degree of pseudoplastic behaviour. AA

- 1248 GANDHI (AP), MISHRA (VK) and ALI (N). Organoleptic assessment of full fat soy flour in various indigenous products. *J. Food Technol.* 18(6); 1983; 771-5

Full fat soy flour was blended with cereal, millet or pulse flours to make a variety of Indian traditional products. It was judged by a trained panel that all the products, namely 'chapati', 'puri', 'pakoda', 'sev', 'bread pakoda', 'soy-peanut crisps', 'burfi', 'Mysore pak' and 'halwa' were all acceptable with no significant differences among the products. AA

- 1249 BOISON (G), TARANTO (MV) and CHERYAN (M). Extrusion of defatted soyflour-hydrocolloid mixtures. Effect of operating parameters on selected textural and physical properties. *J. Food Technol.* 18(6); 1983; 719-30

- 1250 RIZK (SW) and CLYDESDALE (FM). Effect of iron sources and ascorbic acid on the chemical profile of iron in a soy protein isolate. *J. Food Sci.* 48(5); 1983; 1431-5

The chemical changes in the iron profile of a commercial soy protein isolate resulting from ascorbic acid and iron fortification were examined. An *in vitro* method was devised to simulate gastrointestinal pH and an "enhancing factor" developed as a potential *in vitro* indicator of iron bioavailability. Ascorbic acid supplementation of soy protein produced substantial increases in soluble iron at pH 4 and 6. The solubilizing effect of ascorbic acid on iron was concentration and pH-dependent and contingent upon the exogenous iron source present. The exogenous iron entered a different chemical pool than the endogenous iron, thus raising questions about the concept of a nonheme pool at high levels of exogenous iron. AA

SUNFLOWER

- 1251 DREHER (ML) and PADMANABAN (G). Sunflower hull flour as a potential dietary fiber supplement. *J. Food Sci.* 48(5); 1983; 1463-5, 1478

Confectionery hull flour (CHF) and oilseed hull flour (OHF) were evaluated as potential dietary fiber supplements. Analyses included: proximate analyses, neutral detergent fiber, acid detergent fiber, acid detergent lignin and buffered acid detergent fiber, water- and oil-holding capacity, pH, cation exchange capacity, emulsifying activity (EA), Gardner colour values, and sensory evaluation. CHF (90.7% NDF) was slightly higher in dietary fiber than OHF (83.4%). Sunflower hull flours had a relatively high cation exchange capacity, equivalent to lettuce. Sunflower hull flours were highly variable in colour and EA. There was no significant difference in aroma of muffins made with hull flour or wheat bran but differences did exist in appearance, flavour and texture. Sunflower hull flour showed potential as a dietary fiber supplement but its exact physiological effects have not yet been established. AA

- 1252 DEMECZKY (M), SZIGETI (Zs) and VASARHELYI-PEREDI (K). Production of protein isolates from extracted sunflower grits. *Acta Aliment.* 12(3); 1983; 151-61

Six different methods of protein isolation from extracted sunflower grits have been tested. The efficiencies of the different methods were approximately equal, but losses were lowest in the membrane separation technique. The main product of highest solubility was obtained by enzymic hydrolysis and membrane separation. The colour, odour, and flavour of the products were pleasant, and their digestibility was satisfactory. Compared to other oilseeds, sunflower seed has the advantage of being totally free from any unwholesome or toxic agent. Schemes for industrial-scale preparation of an edible sunflower protein isolate, and of a fodder proteins, have been presented. KMD

- 1253 MIETH (G), BRUCKNER (J) and ZIMMERMANN (R). On functional properties of sunflower proteins in wheat dough and bread. Part II. The effects of diverse methods of denaturation in protein isolation. *Nahrung.* 27(2); 1983; 129-40 (German)

The authors studied the effects of wet protein isolates from sunflower seed with thermal and acid pretreatment on wheat dough and baked goods. The variographically determined uptake of water by the dough is positively influenced, whereas the course of dough making is negatively affected in case of strong thermal and/or acid pretreatment of the proteins. These effects are reduced by freeze-drying of the wet protein isolates. AA

ALMOND

- 1254 SAURA-CALIXTO (F), CANELLAS (J) and SOLER (L). Dietary fibre and components of the nitrogen-free extract of almond kernels. *J. Sci. Food Agric.* 34(12); 1983; 1419-22

Determinations of neutral and acid detergent fibre residues (NDF and ADF), hemicellulose, cellulose and lignin in almond nuts (*Prunus amygdalus*) were carried out. The NDF content was about 5% while the crude fibre content was only approximately 2%. The composition of several components of nitrogen-free extract (NFE) such as soluble sugars, starch, gums and mucilages and pectins were also determined, and the results are discussed. AA

GROUNDNUT

- 1255 SCHADEL (WE), WALTER (WM) Jr. and YOUNG (CT). Cotyledon structure of resting peanut (*Arachis hypogaea* L. cv. Florunner) seed before and after hydraulic pressing. *J. Food Sci.* 48(5); 1983; 1405-7

The cotyledon structure of resting peanut (*Arachis hypogaea* L. cv. Florunner) seed before and after hydraulic pressing was investigated with light and scanning electron microscopy. Observations were made of the appearance of cell walls and the major subcellular components: spherosomes (oil reserve bodies), aleurone grains and starch grains. Major findings include previously unreported cell wall damage and surface fissures that may be important to processors who express the oil from peanuts. AA

- 1256 DICKENS (JW) and WHITAKER (TB). Dilution errors in aflatoxin determination caused by compounds extracted from peanuts. *J. Assoc. Off. Anal. Chem.* 66(5); 1983; 1059-52

Extraction of oils, proteins and carbohydrates by solvents, as also inadequate clean-up procedure cause errors in determining the proportion of extracted aflatoxin placed on TLC plates. The errors due to these two causes result in underestimations of aflatoxin by 11% for CB method. A correction specified by the CB method for the fats in the extraction solvent was found to reduce the approximate error for the CB method from 11 to 1%. JVS

- 1257 DAVIDSON (JI) Jr., HILL (RA), COLE (RJ), MIXON (AC) and HENNING (RJ). Field performance of two peanut cultivars relative to aflatoxin contamination. *Peanut Sci.* 10(1); 1983; 43-7

TUBERS AND VEGETABLES

- 1258 WHITE (GW) and SHENTON (AJ). Food microscopy. Part III. An annotated bibliography. Vegetable products. *J. Assoc. Public. Anal.* 21(3); 1983; 93-7

Bibliography covering 100 titles deals with microscopic characteristics of vegetable products, leaf and stem crops (cabbage, brussel sprouts, spinach, cauliflower, asparagus); pulses (peas, runner beans, broadbeans, lentils); root crops, tubers bulbs (potatoes, beets, carrots, parsnips, turnips, onions); salad crops (celery, cucumber, lettuce, cress, tomatoes); fruits (courgettes, vegetable marrows, sweet corn, peppers (green and red); and mushrooms. BSN

BEETROOT

- 1259 WOHLERT (W) and NIESPOREK (P). Influence of size grading on the efficiency of the blanching and peeling process during processing of red beets and celery. *Lebensmittel-industrie*. 30(1); 1983; 29-31 (German)

The results of an additional size grading during the processing of red beets and celery have been studied from the economic standpoint. The composition of the raw material, the peeling losses, and the use of a sizing grate have been discussed. The additional size grading has yielded the following advantages: (i) reduction of steaming time; (ii) increase of throughput by 25%; (iii) reduction of peeling losses by 10-14% for celery, and 11-18% for red beets; (iv) reduction of peeling time by about 30%; and (v) improvement of quality. KMD

CARROT

- 1260 HORVATH-MOSONYI (M), RIGO (J) and HEGEDUS-VOLGYESI (E). Study of dietary fibre content and fibre components of carrots. *Acta Aliment.* 12(3); 1983; 199-210

The authors set out to determine whether the dietary fibre content of carrots depends on the size of the carrot, and whether the dietary fibre contents of the xylem and phloem differ. The dietary fibre content of carrots was always several times greater than the crude fibre content. The water-insoluble, dietary fibre content of (cortex + phloem) was significantly smaller than that of the xylem. This was true in respect of all the components of the fibre, viz. cellulose, crude hemicellulose, crude lignocellulose, lignin, and pectin. Xylem was also found to contain less β -carotene than the cortex + phloem. The mass, or size, of the carrot does not influence the dietary fibre content. KMD

POTATO

- 1261 MONDY (NI) and PONNAMPALAM (R). Effect of baking and frying on nutritive value of potatoes: Minerals. *J. Food Sci.* 48(5); 1983; 1475-8

The effect of conventional baking and frying on the mineral content of Katahdin, Chipbelle and Rosa varieties of potatoes was investigated. The cortex and pith tissues of the tubers were used. Conventional baking reduced the cortical content of potassium, phosphorus, and iron by 10-13%, 4-21%, and 19-31% respectively. In all three varieties, movement of potassium, phosphorus, and iron toward the interior tissues was demonstrated during conventional baking although varieties varied widely in their mineral content. Conventional baking increased the pith content of potassium (14-23%), phosphorus (2-9%), and iron (2-8%). Frying decreased significantly all the minerals in both the cortical and pith areas with the major loss occurring in the cortical area (10-45%). AA

- 1262 ROBINSON (JL), WEINERT (IAG) and SOLMS (J). The analysis of potato starch and lipid in the presence of their inclusion complexes. *Food Sci. + Technol.* 16(4); 1983; 235-8

Several methods for analysis of starch and lipid were used to analyse starch inclusion complexes composed of starch-oleic acid, starch-glycerol-monostearate, and starch-margarine. An enzymic method using thermostable

alpha-amylase for starch degradation gave best results, close to the theoretical level. Other methods with low temperature enzymic starch digestion in combination with NaOH or HCl/DMSO treatment, or the Anthrone method gave less satisfactory results. Criteria for the characterization of complexes were also investigated employing different extraction methods, using Petroleum ether, CHCl_3 -MeOH and ethanol-water as solvents. The extractions were controlled quantitatively with iodine binding determinations. A quantitative extraction of the complexes was not possible with any solvent or solvent combination tried, without prior starch degradation. The importance of these results with respect to dietary fibre determinations is discussed. AA

- 1263 HARBITZ (O). Gel formation of potato starch in the presence of a surfactant. *Starch*. 35(6); 1983; 198-202

The present study has been focussed upon gel formation of potato starch in the presence of the detergent sodium dodecyl sulphate (SDS). Small amounts of SDS (used as a fatty acid substitute) in the solvent result in a slight decrease in the gelatinization temperature of potato starch (as determined by differential scanning calorimetry). Nevertheless, SDS has a large enhancing effect on the gel strength of the starch network after heat treatment. Possible molecular reasons for this effect are discussed. AA

- 1264 WILSON (AM), McGANN (DF) and BUSHWAY (RJ). Effect of growth-location and length of storage on glycoalkaloid content of roadside-stand potatoes as stored by consumers. *J. Food Prot.* 46(2); 1983; 119-21, 125

Mean α -chaconine, α -solanine and total glycoalkaloid contents of potatoes purchased from roadside stands and stored for 1-3 months under home storage conditions (in the state of Maine, USA) at 12.2 C, were 0.41-3.45, 0.35-1.51 and 0.75-6.16 mg/100 g of tuber (wet weight) respectively. Statistical analysis revealed that interaction of location and storage period had a significant ($P < 0.05$) effect on individual and total glycoalkaloids concentration of the tubers stored under the experimental conditions did not lead to increase of glycoalkaloids to a toxic level. BSN

- 1265 LEUNG (HK), BARRON (FH) and DAVIS (DC). Textural and rheological properties of cooked potatoes. *J. Food Sci.* 48(5); 1983; 1470-74, 1496

Cooked potato samples of different cultivars and specific gravities were analyzed for textural and rheological properties by sensory evaluation, texture profile analysis (TPA) and stress relaxation tests. Mealiness was correlated with the product of cohesiveness and adhesiveness, but not with other TPA parameters. Stress relaxation tests of cooked potatoes yielded a Maxwell model consisting of two viscous and three elastic elements. One of the elastic moduli was correlated with mealiness. Hardness by sensory evaluation correlated well with hardness and fracturability by TPA, and with the three elastic moduli in the relaxation model. AA

SWEET POTATO

- 1266 HOOVER (MW), WALTER (WM) Jr. and GIESBRECHT (FG). Method of preparation and sensory evaluation of sweet potato patties. *J. Food Sci.* 48(5); 1983; 1568-69

Sweet potato patties were prepared from Jewel and Centennial cultivars which were freshly harvested or cured and stored. The patties were prepared with additions of sugar, starch and other minor ingredients to peeled, cooked

sweet potatoes. The resulting mixture was comminuted, heated by steam injection, vacuum cooled and molded into patties. The patties were cooked in peanut oil and evaluated by a sensory panel. The evaluations indicated that patties of acceptable quality could be prepared from either freshly harvested sweet potatoes or from roots that had been cured and stored for upto 6 months. AA

ASPARAGUS

- 1267 WANG (Z) and LUH (BS). Characterization of soluble and bound peroxidases in green *Asparagus*. *J. Food Sci.* 48(5); 1983; 1412-7, 1421

CASSAVA

- 1268 NOPARATNARAPORN (N), NISHIZAWA (Y), HAYASHI (M) and NAGAI (S). Single cell protein production from cassava starch by *Rhodopseudomonas gelatinosa*. *J. Ferment. Technol.* 61(5); 1983; 515-9

The optimal conditions for growth under aerobic-dark and aerobic light conditions were found to be 40 C and maximum biomass was produced in 9 and 55 hours respectively. The maximum growth rate was about 0.23 hr⁻¹ with a growth yield of 0.40 g cell/g starch, whereas the growth rate in aerobic-light conditions was 0.13 hr⁻¹ with a yield of 0.83 g cell/g starch. KAR

AMARANTHUS

- 1269 OSUNTOGUN (AB) and OKE (OL). A note on the nutritive value of amaranth seeds. *Food Chem.* 12(4); 1983; 287-9

Analysis of *Amaranthus hybridus* seeds shows that they contain a high amount of protein (13.1%) of high biological value. The PER (2.3) is comparable to that of casein (2.5); so also the biological value, digestibility and net protein utilisation. The tannin content (0.15%) seems to be sufficiently low to have no significant effect on the nutritional value. AA

TOMATO

- 1270 ZETELAKI-HORVATH (K). Endo-polygalacturonase in tomato processing. *Acta Aliment.* 12(3); 1983; 185-87

Tomatoes were processed with the enzyme endo-polygalacturonase (endo-PG) using enzyme concentrations of 0.05, 0.1 or 0.2%, at temperatures of 30, 40 or 45 C, for periods of 30 or 60 minutes. The effects of these treatments on juice yield, dry matter content and viscosity of the juice, straining loss, time taken for concentration, and the dry matter content and yield of the final products were studied. No advantage was gained by extending the duration of treatment to 60 minutes. All the parameters studied showed improvements when the enzyme concentration was increased from 0.05 to 0.1%, but there was no further improvement when the enzyme concentration was raised to 0.2%. Increase of temperature from 30 to 40 C proved to be advantageous, but no additional advantage was obtained by raising the temperature to 45 C. Thus, treatment of tomatoes crushed during mechanical harvesting with 0.1% endo-PG at 40 C for 30 minutes resulted in a highly significant decrease by 11-26% in straining loss and in the time required for

concentration (by 12-55%); moreover, the yield of dry matter was also higher (by 13-16%). Treatment with endo-PG also resulted in an increase in the number of smaller particles (10-30 μ m) at the expense of the larger ones (40-90 μ m). KMD

- 1271 STERRETT (SB), REYNOLDS (CW), SCHALES (FD), CHANEY (RL) and DOUGLASS (LW). Transplant quality, yield, and heavy-metal accumulation of tomato, muskmelon, and cabbage grown in media containing sewage sludge compost. *J. Am. Soc. Hortic. Sci.* 108(1); 1983; 36-41

- 1272 ADEGOROYE (AS) and JOLLIFFE (PA). Initiation and control of sunscald injury of tomato fruit. *J. Am. Soc. Hortic. Sci.* 108(1); 1983; 23-8

- 1273 TAKADA (N) and NELSON (PE). A new consistency method for tomato products: The precipitate weight ratio. *J. Food Sci.* 48(5); 1983; 1460-62

The precipitate weight ratio (PPT) which refers to the weight ratio of precipitate to the initial sample weight after centrifugation was found to be highly correlated with the Bostwick consistency and the efflux viscosity of tomato products. Lower correlation coefficients were found for products containing added ingredients. However, the PPT may be a unique and reliable parameter to evaluate the consistency of tomato products before formulation. AA

- 1274 TAKADA (N) and NELSON (PE). Pectin-protein interaction in tomato products. *J. Food Sci.* 48(5); 1983; 1408-11

The pH influenced the viscosity of a model system of tomato product which consisted of citrus pectin and bovine serum albumin. The viscosity change was completely reversible depending on the pH. The same pH effect was observed in tomato products. Since the amino acid compositions of proteins suggest that the electrostatic property of water-soluble protein fraction from tomato juice can be similar to that of bovine serum albumin, the comparison of pH effects indicates that pectin-protein interaction may be involved in consistency of tomato products. Denaturation of protein may result in a decrease in the serum viscosity during processing. AA

- 1275 ALDRED (JB). The relationship between the Howard Mould Count and the enumeration of mould filaments in tomato products. *J. Assoc. Public. Anal.* 21(3); 1983; 73-6

The procedure outlined for converting Howard mould count into the number of mould filaments per unit volume establishes a linear relationship between the two. The presence of mould filaments per unit volume indicating the rot fragment count aids calculation of Howard mould count at different concentrations of tomato solids in tomato products. BSN

- 1276 NIRANKAR NATH, RAO (AV) and GUPTA (RG). Thermal resistance of pectin methyl esterase in juice of Pusa-Ruby tomatoes. *Indian Food Packer.* 37(5); 1983; 30-38

Pectin methyl esterase is the most heat resistant enzyme in tomato. Its thermal resistance in Pusa-Ruby varieties was determined. The T.I.T. tube method was followed in these studies. For estimating effectiveness of the come-up time formula, method of process evaluation was found to give values very close to those obtained by the graphical method. Average effectiveness varied between 42.59 and 44.9%. The enzyme had a $F_{80}^{7.2} = 0.64$ and $D_{80}^{7.6} = 0.47$ at pH 3.7, $F_{80}^{6.6} = 0.81$ and $D_{80}^{7.0} = 0.54$ at pH 4.1, and $F_{80}^{9.0} = 4.29$ and $D_{80}^{9.2} = 1.93$ at pH 4.5. For commercial processing a 2D,

2.5 D or 3.5 D process at pH 3.7, 4.1 or 4.5 respectively, are recommended.
BSN

OKRA

- 1277 TEOTIA (MS), KALRA (CL), RAINA (BL) and PRUTHI (JS). Influence of pre-treatments on the quality of canned okra (*Hibiscus esculentus* L.) - a comparative study. *Indian Food Packer*. 37(5); 1983; 50-56

Okra when canned in brine, tends to be soft in texture, mucilageous and causes the covering liquid to be thick and viscous. Of the six different pre-treatments tried, the following conditions of pre-treatment were found to be the best and are recommended. The cut okra pieces (3.5-4.0 cms. long) were blanched in 0.1% citric acid simmering hot solution for two minutes, steeping in 1.0% CaCl_2 solution at room temperature (38 C) for two hours, followed by thorough washing and draining before canning. About 200-210 g. of treated okra pieces were packed in plain A-1 tall cans, covering with hot 2.5% common salt (NaCl) solution containing 0.4% citric acid and 1.5% sugar. They were exhausted to 82 C can centre temperature, sealed hot and processed for 30 minutes in boiling water. Okra canned by this process was found to be the most superior in good colour retention, firm texture, acceptable taste and flavour, least mucilagenous on the surface of the pieces and in the brine and good clarity and normal viscosity of the covering brine. BSN

BUFFALO GOURD

- 1278 DREHER (ML), TINSLEY (AM), SCHEERENS (JC) and BERRY (JW). Buffalo gourd root starch. Part II. Rheological behaviour, freeze-thaw stability, and suitability for use in food products. *Starch*. 35(5); 1983; 157-62

The gelatinization and rheological properties, of this starch resembled those of maize starch more closely than those of other root and tuber starches. Gels subjected to freeze-thaw conditions underwent a significant degree of retrogradation, indicating that this starch needs some chemical modification before it can be used in frozen products. Vanilla and chocolate puddings prepared with buffalo gourd starch were found acceptable by consumers. KMD

- 1279 SCHEERENS (JC), DREHER (ML), BEMIS (WP) and BERRY (JW). Buffalo Gourd root Starch. Part III. Effects of plant age and spacing upon the physico-chemical and rheological properties. *Starch*. 35(6); 1983; 193-8

The root starch of the buffalo gourd (*Cucurbita foetidissima* HBK) reached a plateau level (18% of fresh weight) after 2.5 months of growth in 1979, but continued to increase up to the age of 4.5 months in 1981. No substantial changes were observed as age advanced; however, there was a small decrease in starch content, and a concomitant increase in free sugar content. Internal organization within the starch granule appeared to decrease with plant age. All samples formed well developed pastes, the viscosity of which increased upon cooling; the final gel strength was independent of plant age and spacing. KMD

FRUITS

- 1280 BOCK (W) and OHM (G). Influence of the grown biological structure on the water binding capacity of preparations from selected fruit and vegetables. *Nahrung*. 27(2); 1983; 205-10 (German)

Powdered ethanol-insoluble substances and lignocellulose preparations from selected kinds of fruit and vegetables possess in air-dried condition a relatively high water binding capacity of 7 to 18 g water per g. These values that were determined with the capillary suction method are reduced to 2 to 4 g/g by destruction with vibration grinding of the micro- and ultrastructures detected by scanning electron microscopy. The influence of the grown biological structure on the water binding capacity is generally considerably greater than that of the quantitative composition of the macromolecular cell wall components of fruit and vegetables. The results are discussed with regard to technology and nutrition physiology. AA

DATE

- 1281 SAWAYA (WN), KHALIL (JK), SAFI (WJ) and KHATCHADOURIAN (HA). Date bars for tified with soy protein isolate and dry skim milk. *J. Food Sci.* 48(5); 1983; 1503-6

Fortification of plain and chocolate coated date bars with soy protein isolate (SPI) and dry skim milk (DSM) in different proportions (1.5% SPI + 10.5% DSM; 3.0% SPI + 7.0% DSM and 4.5% SPI + 3.5% DSM) resulted in an increase of protein, fat, fiber, ash, Na, K, Ca, Mg, P, Zn, and all the essential amino acids. The chemical score increased from 48 to a range of 83-95. The *in vitro* protein digestibility (IVPD) values (77.8-81.8%) and calculated protein efficiency ratios (C-PERs) of the fortified bars (2.40-2.47) were close to the IVPD (90.0%) and C-PER (2.50) of ANRC-casein. In general, sensory evaluation indicated no difference in the control and fortified date bars, which were stored up to six months. 1.5% SPI + 10.5% DSM was the optimum level of supplementation in terms of nutritive benefit. AA

STRAWBERRY

- 1282 DAVIES (AMC) and DENNIS (C). Distribution of potassium, calcium and magnesium in strawberry fruits in relation to breakdown of the sulphited fruit. *Food Chem.* 12(4); 1983; 219-28
- 1283 DRAWERT (F) and BERGER (RG). On the biogenesis of aroma compounds in plants and fruits. XX. Influence of exogenous parameters on aroma biosynthesis in strawberry fruit. *Food Sci. + Technol.* 16(4); 1983; 209-14 (German).

GRAPE

- 1284 SZYJEWICZ (E) and KLIOWER (WM). Influence of timing of ethephon application on yield and fruit composition of chenin blanc grapevines. *Am. J. Encl. Vitic.* 34(2); 1983; 53-6

- 1285 WOLPERT (JA), HOWELL (GS) and MANSFIELD (TK). Sampling Vidal blanc grapes. I. Effect of training system, pruning severity, shoot exposure, shoot origin, and cluster thinning on cluster weight and fruit quality. *Am. J. Enol. Vitic.* 34(2); 1983; 72-6

- 1286 CAYREL (A), CROUZET (J), CHAN (HWS) and PRICE (KR). Evidence for the occurrence of lipoxygenase activity in grapes (variety Carignane). *Am. J. Enol. Vitic.* 34(2); 1983; 77-82

Evidence of lipoxygenase activity on grapes (variety Carignane) was obtained by four different methods: oxygen uptake enzymatically catalyzed in the presence of linoleic acid; increase in absorbance at 234 nm by the action of a partially purified enzyme on linoleic acid; inhibition studies by elaidolinoleic acid and cyanide ions; and isolation and identification of isomeric hydroperoxides by HPLC and GC-MS. The results obtained by HPLC show that, after the action of grape enzymes on linoleic acid, 80% of 13-hydroperoxides and 20% of 9-hydroperoxides are formed. These results agree with the formation of C₆ aldehydes and alcohols from C₁₈-hydroperoxides. Hypotheses concerning the destiny of 9-hydroperoxides are discussed. AA

- 1287 WICKS (AS) and KLIEWER (WM). Further investigations into the relationship between anthocyanins, phenolics and soluble carbohydrates in grape berry skins. *Am. J. Enol. Vitic.* 34(2); 1983; 114-6

Light and/or ethephon treated Riber and Emperor varieties of table grapes showed significant changes in anthocyanins and phenolics in the skin, without any significant change in soluble skin carbohydrates. BSN

- 1288 NAKAMURA (K), AMANO (Y) and KAGAMI (M). Purification and some properties of a polyphenol oxidase from kosu grapes. *Am. J. Enol. Vitic.* 34(2); 1983; 122-7

- 1289 LEE (CY), PENNESI (AP) and SMITH (NL). Purification and some properties of peroxidase from De Chaunac grapes. *Am. J. Enol. Vitic.* 34(2); 1983; 128-9

BANANA

- 1290 ADAMBOUNOU (TL) and CASTAIGNE (F). Partial dehydration of bananas by osmosis and determination of isotherm sorption curves. *Food Sci. + Technol.* 16(4); 1983; 230-34 (French)

This research was aimed at studying partial dehydration by osmosis of banana slices dried at 65 C under vacuum. Dehydration experiments using osmosis at 60 C and 40 C have shown that saccharose gain and water loss were faster at 60 C than at 40 C, especially during the first 20 minutes. With an initial ratio of saccharose to banana slices (S_0/B_0) of 4, and after dehydration, banana had lost 50% of the original weight and had a saccharose content of 28%. Isotherm sorption curves indicated that the dried banana samples (9.5% water) may be classified as highly hygroscopic products. AA

- 1291 LIMA (AWO) and CAL-VIDAL (J). Hygroscopic behaviour of freeze dried bananas. *J. Food Technol.* 18(6); 1983; 687-96

The hygroscopic behaviour of freeze dried bananas at several temperatures is presented. The adsorption isotherms were of sigmoid shape and the

particle size of the freeze dried materials did not affect the general isothermal behaviour. The limits for caking were found at a water activity (a_w) of about 0.33 at 38 C. The results fit the Henderson equation quite well at the four temperatures under test. AA

CITRUS

- 1292 DAFFERTSHOFER (G). Citrus oils and citrus aromas. *Gordian*. 83(6); 1983; 122-6 (German)

This general review covers the occurrence and striking characteristics - including the most important aroma compound - of the peel oils of various citrus fruits, namely:- lemons, oranges, mandarins, grapefruits, limettes (or limes), and bergamots. KMD

GRAPEFRUIT

- 1293 BARMORE (CR), PURVIS (AC) and FELLERS (PJ). Polyethylene film packaging of citrus fruit: containment of decaying fruit. *J. Food Sci.* 48(5); 1983; 1558-9

Decaying grapefruit (*Citrus paradisi* Macf.) stored under nonventilated conditions caused a substantial reduction in the oxygen and an increase in the carbon dioxide concentrations in the atmosphere. A comparable increase in the internal carbon dioxide concentration of sound fruit in the same container was also observed. Low oxygen caused an increase in the ethanol concentration in the juice of the sound fruit and the development of an undesirable stale flavour. Containment of the decaying fruit in polyethylene film limited the oxygen depletion. Thus, flavour quality of sound fruit from the containers with PE film-sealed decaying fruit was comparable to that of sound fruit stored in the absence of decaying fruit. AA

ORANGE

- 1294 ECKERT (JW) and RAHM (ML). Azomethims of *sec*-butylamine for the control of *Penicillium* decay of oranges. *Pestic. Sci.* 14(3); 1983; 220-28

Imines, synthesised by the reaction of *sec*-butylamine (SBA, 2-amino butane) with pentan-2-one, heptan-2-one, octan-2-one, undican-2-one, benzaldehyde and 2-furaldehyde were evaluated as vapour-phase treatments to prevent the infection of oranges by *Penicillium digitatum*. All the imines provided decay control equivalent to SBA when they were introduced into the fruit container at a rate equivalent to 16.4 mg SBA litre⁻¹ air volume. All the imines were stable in the gaseous state in dry air. KAR

APRICOT

- 1295 WILLS (RBH), SCRIVEN (FM) and GREENFIELD (H). Nutrient composition of stone fruit (*Prunus* spp.) cultivars: Apricot, cherry, nectarine, peach and plum. *J. Sci. Food Agric.* 34(12); 1983; 1383-9

PEACH

- 1296 LEONARD (SJ), HEIL (JR), CARROAD (PA), MERSON (RL) and WOLCOTT (TK). High vacuum flame sterilized fruits: Storage study on sliced clingstone peaches, sliced Bartlett pears and diced fruit. *J. Food Sci.* 48(5); 1983; 1484-91

Slices of four major commercial clingstone peach varieties, slices of Bartlett pears from major growing areas, and mixtures of diced peaches and pears were successfully vacuum packed without the conventional covering syrup or water. For selected packs, the fruits were sweetened to the desired cutout °Brix value with concentrated syrup. The high vacuum flame sterilized packs (HVFS) required only 7.5 minutes total heating for pear and peach slices and 5.5 minutes for diced fruit to achieve biological stability. Because of the minimal process, all HVFS fruits retained more of the original flavour attributes and texture of the fresh fruit through 18 months storage than did the conventional packs. Omission of the covering liquid, combined with the necessary blanching treatment, allowed packing of 1/3 more fruit into a standard size can. AA

APPLE

- 1297 JONES (HG), HIGGS (KH) and SAMUELSON (TJ). Calcium uptake by developing apple fruits. 1. Seasonal changes in calcium content of fruits. *J. Hortic. Sci.* 58(2); 1983; 173-82

- 1298 LAU (OL), MEHERIUK (M) and OLSEN (KL). Effects of "Rapid CA", High CO₂, and CaCl₂ treatments on storage behaviour of 'Golden Delicious' apples. *J. Am. Soc. Hortic. Sci.* 108(2); 1983; 230-33

Excellent firmness retention in 'Golden Delicious' apples was achieved in a "rapid CA" (rapid reduction of O₂ by use of N₂ flushing) storage procedure. Pretreatment of the fruit with high levels of CO₂ prior to rapid CA had little or no effect on firmness. Higher flesh calcium content was beneficial in firmness retention when fruit was stored in air, in "slow CA" (O₂ reduced by fruit respiration), or held in air for 10 days prior to rapid CA. Rapid CA provides an effective means to control softening in 'Golden Delicious' apples and to avoid injury caused by calcium and high CO₂ treatments. AA

- 1299 WILLIAMS (AA) and LANGRON (SP). Influence of different controlled atmospheres and post-storage temperatures on the acceptability of Cox's orange Pippin and Suntan apples. *J. Sci. Food Agric.* 34(12); 1983; 1375-82

Apples stored at 4°C in 2% O₂, <1% CO₂ and 1% O₂ < 1% CO₂ and subsequently held for 10 days in air at 4°C or 17°C, showed them to be equally acceptable. Fruit stored at the lower O₂ level and held post-storage at the lower temperature was less sweet and sharp, but had a crisper and juicier texture than fruit stored at the higher O₂ concentration and post-storage temperature. KAR

- 1300 LURIE (S) and BEN-ARIE (R). Characterization of plasmalemma ATPase from apple fruit. *Phytochemistry*. 22(1); 1983; 47-52

- 1301 KRUGER (G) and SCHAFER (F). Examination methods and valuation criteria for apple aroma concentrates. *Lebensmittel-industrie* 30(1); 1983; 13-8 (German)

A correlation has been established between the sensory evaluation of apple aroma and gas-chromatographic analysis of apple aroma constituents. Based on this correlation, a method of evaluation of natural apple aroma concentrates has been developed. The storability of natural apple aroma concentrates, and their stability in apple juices have also been discussed. KMD

- 1302 WILLIAMS (AA), ARNOLD (GM) and WARRINGTON (M). The evaluation of the apple cultivars Bramley's Seedling, Suntan and East Malling A 3022 for the production of apple slices. *J. Food Technol.* 18(6); 1983; 697-710

Comparison of slices of the apple cultivars Bramley's Seedling, Suntan and East Malling A 3022 showed that both objective and subjective assessments were considerably influenced by: (1) preparatory procedure (blanching time, sugar or malic-acid additions), and (2) storage (whether as whole fruit or as previously prepared frozen slices). The addition of sugar and acid and method of storage produced a more marked effect than differences due to cultivar. Although Bramley's Seedling could be distinguished objectively from the other two cultivars, primarily on the basis of appearance, this had little influence when it came to making hedonic assessments. Products from Suntan and East Malling A 3022 were considered at least as good in a number of respects as those from Bramley's Seedling. AA

PAPAYA

- 1303 LEVI (A), GAGEL (S) and JUVEN (B). Intermediate moisture tropical fruit products for developing countries. I. Technological data on papaya. *J. Food Technol.* 18(6); 1983; 667-85

The effects of short heat (boiling temperature) treatments, consisting of 'blanching' in concentrated sucrose (70%) solution (I), or plain water (II); or osmotic dehydration in cold (room temperature) (III) or hot (boiling) sucrose (70%) solution (IV); and a combination of (III) following (I) or (II), on the drying behaviour of papaya, dehydrated to the intermediate moisture (IM) range, were studied. Significant increases were observed in the dry matter content of papaya treated as above (I, III, IV or III following I or II), with the obvious increase in the expected production yields and probable reduction of the heat energy needed for the drying process. The drying time needed for cabinet or solar drying following osmotic treatments of papaya was considerably shortened, and therefore a significant saving in the heat energy needed for drying is to be expected. The optimal treatments to achieve a considerable shortening in the drying time, without affecting negatively the quality of the IM papaya, seemed to be syrup 'dipping', or a combination of water or syrup blanching and cold osmotic dehydration. BSN

GUAVA

- 1304 RITA SINGH, KAPOOR (AC) and GUPTA (OP). The effect of cultivars, seasons and storage on the nutritive value and keeping quality of guava cheese. *Indian Food Packer.* 37(5); 1983; 71-77

Allahabad Safeda, Banarasi surkha and Lucknow-49 cultivars of guava from winter and rainy season crops were utilised for preparation of guava cheese stored at RT (10-18 C in winter and 20-30 C in summer and low temperature (4 C) for 120 days and examined for the effect on nutritive value

((a) ascorbic acid, (b) pectin content) and increase in browning and microbial counts. Loss of (a) varied from 33-50%, while microbial counts were within the safe range limits and the product remained organoleptically acceptable at the end of storage period. BSN

ANOLA

- 1305 RAM (HB), JAIN (SP), TRIPATHI (VK) and SURJEET SINGH. Composition of Aonla (*Emblica officinalis* Gaerth) fruits during growth and development: Part I. *Indian Food Packer*. 37(5); 1983; 57-60

In a study to evaluate the effect of maturity on the quality of aonla preserve, it was observed that the optimum stage of harvesting the fruits fell between the period extending from the second week of December to the third week of January in northern plains. The fruit should have average weight of 43.95-50.31 g, pressure test 18.50-19.60 lb/sq. inch., specific gravity 1.04-1.32, T.S.S. 15.60-15.90°B, acidity 2.59-2.49%, ascorbic acid 500.5-564.0 mg/100 g and tannin 1.09-0.52%. AA

SUGAR, STARCH AND CONFECTIONERY

- 1306 IGNATOV (VG) and MARKOVA (N). Thermal effects in wetting of pectins by methanol. *Starch*. 35(5); 1983; 176-8 (German)

In the present paper the wetting heat of pectins of various degrees of esterification by methanol, using a microcalorimeter, was studied. It was shown that a strict proportionality exists between the number of methoxylated carboxylic groups and the released heat occurred in wetting of pectins by methanol. The heat released exceeded by one order of magnitude to those obtained in wetting by the remaining aliphatic alcohols. The exoeffect was due to physical adsorption, and no additional esterification was observed. The specific interaction between methanol and pectins allows the latter to be used as adsorbents of methanol from aqueous methanol-ethanol mixtures. AA

- 1307 GRAEFE (G) and TEGGE (G). Vocabulary starch. Parts I & II. *Starch*. 35(6&7); 1983; 207-215 and 243-255.

The international standard (ISO 1227-1973) which contains definitions of the technical terms used in the starch industry has now been revised. The second edition of this standard represents an updated trilingual (English-French-German) vocabulary of "Starch" terms. It contains definitions of 192 terms arranged under the following headings: 1-General Terms. 2-Raw Materials. 3-Technology (3.1-Industries; 3.2-Procedures and Manufacturing Terms; 3.3-Auxiliary materials). 4-Products (4.1-Native starches; 4.2-Modified starches; 4.3-Hydrolysis products; 4.4-Other products). 5-Analytical Terms. KMD

- 1308 OOSTEN (BJ). Explanations for phenomena arising from starch-electrolyte interactions. *Starch*. 35(5); 1983; 166-9

In a previous contribution a hypothesis has been proposed to explain the substantial rise of the gelatinization temperature resulting from the addition of sodium hydroxide to a salty starch suspension. Other phenomena arising from the interactions between starch and electrolytes as reversible swelling of starch, stable starch suspensions in concentrated solutions

of electrolytes, influence of acids and changes in heats of adsorption and desorption can be explained by the same hypothesis. This contribution is devoted to explain these phenomena. AA

- 1309 HOLLO (J), LASZLO (E) and HOSCHKE (A). Enzyme engineering in starch industry. *Starch*. 35(5); 1983; 169-75
- 1310 FROSTELL (B). Anaerobic-aerobic biological treatment of starch industry waste waters. *Starch*. 35(6); 1983; 185-9
 The anaerobic treatment of potato starch waste water was studied in a full-scale plant, during two seasons: 1977-78 and 1981-82. During the first season, BOD₅-reduction was generally 98-99%, and there was also a substantial reduction in N and P, during the second season, BOD₅-reduction was of the order of 90-98%. Pilot-scale studies were also done with waste water from a wheat starch industry and a bourbon (whisky) distillery. Very high overall reductions were obtained: COD > 90%; BOD₅ 97-99%. Introduction of a denitrification stage in the pilot test with bourbon distillery waste water resulted in nitrogen reductions of 95%. KMD
- 1311 CRAMER (F). Cyclodextrins - Old friends, new trends. *Starch*. 35(6); 1983; 203-6 (German)
 Some of the characteristic properties and characteristics of cyclodextrins have been reviewed; namely: empty (or hollow) spaces in solutions; empty (or hollow) spaces in crystals; and enzyme-like catalysis. Thus, cyclodextrins offer an ideal set of models for the study of enzyme specificity and enzymatic catalysis, and are themselves models for models: paradigmatic models. KMD

CHOCOLATE

- 1312 COLLINS (J). Chocolate moulding. *Manuf. Confect.* 63(1); 1983; 49-51
 Discusses the principles, equipment needed and techniques involved in processing of chocolate moulding. BSN
- 1313 TANERI (CE). Effect of concentration of alkalis on percent FFA in chocolate. *Manuf. Confect.* 63(4); 1983; 59-60
 Thirty per cent caustic soda in treatment of chocolate liquor was found harmless and did not cause any increase in FFA in chocolate. It was also observed that in dutching cocoa, it was advisable to use K₂CO₃ to obtain red colour in the product. BSN

BAKERY PRODUCTS

- 1314 SANKARAN (R) and LEELA (RK). Prevalence of enterotoxigenic staphylococci in bakery products. *J. Food Prot.* 46(2); 1983; 95-7
 The aerobic plate count varied between 10² to 10⁴ CFU/g in a variety of bakery products including sweet cakes, sweet puffs, vegetable puffs and cream buns. Puffs containing vegetable filings showed the highest counts, while the least was in bread and buns. *Bacillus*, *Micrococcus*, *Staphylococcus*, *Enterobacter*, *Escherichia* and *Klebsiella* were identified as the genera of microorganisms observed. Cream filled cakes and puffs containing coconut scrappings showed the presence of staphylococci, which

were capable of producing enterotoxins. KMD

BREAD

- 1315 SEIBEL (W). 24th DLG Quality Tests for Wheat Breads and Fine-Baked Goods. *Getreide Mehl. Brot.* 37(3); 1983; 89-94 (German)

The paper contains some notes on the quantity and quality of bread grains harvested in 1981 and 1982 in W. Germany, as well as the results of the quality tests conducted on a wide variety of (i) wheat breads (white bread, white bread with or without fat and sugar, with or without bran, bread rolls, toast bread), and (ii) fine baked goods (such as those made with or without yeast, with or without fillings, cakes, pizza, and dietetic products). The number of entries that did not win a prize is very low in both categories (i) and (ii). The new 5-point scheme used for evaluation proved to be very good. Overall, the results are as good as those obtained in 1981. KMD

- 1316 RANHOTRA (G), GELROTH (J), NOVAK (F), BOCK (A) and BOHANNON (F). Iron-enriched bread: Interaction effect of protein quality and copper on iron bioavailability. *J. Food Sci.* 48(5); 1983; 1426-8

The test breads also contained added protein in the form of gluten, soy or nonfat dry milk. Bioavailability was assessed based on net hemoglobin synthesis in rats initially made iron deficient and then fed bread-based diets containing 38.5 ppm iron (NRC requirement for rat, 35 ppm) and 3.75, 5.00, or 6.25 ppm copper (NRC requirement for rat, 5 ppm). More hemoglobin was synthesized on milk-supplemented (83 mg/mg iron) and on soy-supplemented (85 mg/mg iron) bread diets than on gluten-supplemented (59 mg/mg iron) bread diets. Copper appeared to have no influence on hemoglobin regeneration or on hepatic iron accumulation under the conditions of this experiment. AA

- 1317 RAIDL (MA) and KLEIN (BP). Effects of soy or field pea flour substitution on physical and sensory characteristics of chemically leavened quick breads. *Cereal Chem.* 60(5); 1983; 367-70

The studies have revealed that wheat flour in quick breads may be substituted by defatted soy flour, without adversely affecting bread quality. Field pea flour, however, at the same level of incorporation produced adverse effects on physical and sensory characteristics of bread. BSN

CAKE

- 1318 HESS (DA) and SETSER (CS). Alternative systems for sweetening layer cakes using aspartame with and without fructose. *Cereal Chem.* 60(5); 1983; 337-41

- 1319 MIZUKOSHI (M). Model studies of cake baking. III. Effects of silicone on foam stability of cake batter. *Cereal Chem.* 60(5); 1983; 396-99

0.5-10 ppm of silicone in cake batter caused poor batter expansion, small cake volume, a gummy layer, bottom rise, coarse grain and a ring like pattern on the cake. BSN

- 1320 MIZUKOSHI (M). Model studies of cake baking. IV. Foam drainage in cake batter. *Cereal Chem.* 60(5); 1983; 399-402

A foam drainage test has been described. Rate of drainage was found to be proportional to the volume of undrained liquid in the foam. Drainage increased upto 60 C and then decreased at 65 C. Drainage rates at temperatures between 40-55 C were in good agreement with Arrhenius equations. Cake batter viscosity influenced drainage rate significantly. Close relationship was observed between drainage rate in cake batter and formation of gummy layer in cakes. BSN

SPAGETTI

- 1321 DEXTER (JE), MATSUO (RR) and MORGAN (BC). Spagetti stickiness: Some factors influencing stickiness and relationship to other cooking quality characteristics. *J. Food Sci.* 48(5); 1983; 1545-51, 1559

Spagetti was processed in a semi-commercial scale laboratory press from a range of raw materials, dried by a low temperature (LT) and a high temperature (HT) drying cycle, and assessed for stickiness and other important cooking quality attributes in cooking waters of varying hardness. Cooked HT spaghetti was generally less sticky, more resilient, firmer, and exhibited lower cooking loss than corresponding LT spaghetti. As cooking water hardness increased, spaghetti became stickier and cooking loss increased. Stickiness was influenced by cultivar, wheat class, raw material granulation and protein content, but was not related to sprout damage. Stickiness was significantly correlated to cooking loss, cooked weight, degree of swelling, compressibility, recovery, and firmness. However, even when all these factors were included in a step-up regression less than 50% of the variance in stickiness could be predicted. AA

MILK AND DAIRY PRODUCTS

- 1322 STRUNK (DH), TIMMEL (BM), RAPP (FL) and AICKEN (JC). Proof determination of liquors and alcoholic dairy products. *J. Assoc. Off. Anal. Chem.* 66(5) 1983; 1148-51

A method for determining ethanol level in liquor-type of products containing dissolved solids. The sample is distilled in a glass still, the proof of the distillate is diluted to a specific volume and measured by a density meter. Six different synthetic liquors containing ethanol-water-sugar mixtures and 2 alcoholic dairy products showed proof of 32 to 92 C (Standard deviation 0.069 to 0.278; and coefficient of variation for this method, 0.20 to 0.36 C). JVS

- 1323 TOOKOS (I). Experiments on the physicochemical treatment of dairy waste-waters. *Acta Aliment.* 12(3); 1983; 163-84

The quality characteristics of dairy waste-waters have been reviewed, and the results of physico-chemical treatments, applied either batch-wise or continuously, over a period of years have been reported. Three methods of protein coagulation were found to be practicable. The coagulated protein could then be separated either by flotation or by sedimentation. Coagulation at iso-electric point followed by phase separation by means of flotation appears to be preferable in larger plants; whereas, in smaller plants, precipitation by addition of lime, followed by sedimentation appears to be more advisable. KMD

MILK

- 1324 SWARTZEL (KR). Tubular heat exchanger fouling by milk during ultra high temperature processing. *J. Food Sci.* 48(5); 1983; 1507-11, 1557
- 1325 SUDARSAN BARUA, GARG (BS), SINGH (RP) and ISHWAR SINGH. A rapid spectrophotometric method for trace determination of copper in milk. *J. Indian Chem. Soc.* 60(1); 1983; 64-6
 Copper (Cu) (II) interacts with 4-(2-quinolyazo) phenol (p-QAP) to give a violet coloured (1:3) complex soluble in an ethanolic medium. The complex exhibits maximum absorbance at 535 nm in the pH range 8.5-11.1. The Sandell's sensitivity of the colour reaction is $0.0008 \mu\text{g}/\text{cm}^2$ ($=8.3 \times 10^4$). The reagent has been found to be fairly selective for the determination of Cu (II) in the presence of various interfering metal ions. Various milk samples contained the following amounts of Cu: cow milk, 0.2-0.232 ppm; buffalo milk 0.192-0.218 ppm; goat milk, 0.078-0.105 ppm; camel milk, 0.121-0.133 ppm; milk sold in retail, 0.219-0.260 ppm. The method described in this paper is simple and rapid, and determines Cu selectively in the presence of Fe. KMD
- 1326 PERFETTI (GA), JOE (FL) Jr. and FAZIO (T). Reverse phase high pressure liquid chromatography and fluorescence detection of ethoxyquin in milk. *J. Assoc. Off. Anal. Chem.* 66(5); 1983; 1143-7
 Milk solids are precipitated by adding acetonitrile, and the water-acetonitrile supernate is washed with hexane to remove fat. Addition of sodium chloride causes the water-acetonitrile solution to separate into an aqueous phase and an acetonitrile thus separating ethoxyquin from most-water soluble impurities. A large volume of water is added to acetonitrile layer and ethoxyquin is partitioned into hexane which is removed at reduced pressure. The residue is dissolved in a mobile phase and analysed on a 4.6 mm id x 250 mm, Ultrasphere ODS column using fluorescence detection (excitation 230 nm; 418 cut off filter). Water-acetonitrile with a diethylamine-acetic acid buffer is a mobile phase. Recoveries from samples fortified at 1, 5, and 10 ppb averaged 78% with a coefficient of variation of 5.0%. Low levels (< 1 ppb) of apparent ethoxyquin were found in commercial milk samples, that were analysed by using the method. AA
- 1327 KROLL (S) and KLOSTERMEYER (H). Production of proteases by *Pseudomonas fluorescens* in milk. *Z. Lebensmittel. Unters. Forsch.* 178(1); 1984; 9-14 (German)
- 1328 KWAN (KKH), NAKAI (S) and SKURA (BJ). Comparison of four methods for determining protease activity in milk. *J. Food Sci.* 48(5); 1983; 1418-21
- 1329 BROUSSALIAN (J) and WESTHOFF (D). Influence of lactose concentration of milk and yoghurt on growth rate of rats. *J. Dairy Sci.* 66(3); 1983; 438-43
- 1330 McINTOSH (LJ). Observations on the development and impact of BS 3095. Pt. 2. (recommendations for the interpretation of the freezing point depression of herd milk) on the control of extraneous water in milk. *J. Assoc. Public. Anal.* 21(3); 1983; 77-82

- 1331 AHMED (AA-H), MOUSTAFA (MK) and MARTH (EH). Incidence of *Bacillus cereus* in milk and some milk products. *J. Food Prot.* 46(2); 1983; 126-8
 Analysis of four hundred samples of milk, consisting of raw milk (i), pasteurised milk (ii), cheddar cheese (iii), ice cream (iv) and yoghurt (v) showed presence of *Bacillus cereus* in 9, 35, 14 and 48% in (i), (ii), (iii) and (iv) respectively. Level of contamination in (i), (ii), (iii) and (iv) was 100/ml, 100/ml, 200/g and 3800/g respectively. BSN
- 1332 PEELER (JT), LESLIE (JE), BARNETT (JE), HOUGHTBY (GA) and MESSER (JW). Detectability and precision of the AOAC *Bacillus stearothermophilus* disc assay demonstrated in the 1981 FDA split milk sample testing program. *J. Food Prot.* 46(2); 1983; 84-6
- 1333 WHIPPLE (GD), DAVIDSON (PM) and SANDERS (OG). Economic and consumer acceptability of a reconstituted milk product. *J. Dairy Sci.* 66(3); 1983; 381-9
- 1334 HORI (T). Effects of rennet treatment and water content on thermal conductivity of skim milk. *J. Food Sci.* 48(5); 1983; 1492-6
- 1335 DRIOU (A), HUMBERT (G), PAQUET (D) and ALAIS (C). Estimation of skimmed milk powder in composite food products: analysis of a protocol, and possibilities of application. *Ind. Aliment. Agric.* 100(5); 1983; 303-12 (French)
 The principle of coagulation of casein by rennet has been employed for the estimation of skim-milk powder or butter-milk powder in animal feeds. But equating butter-milk with skim milk has given rise to problems which have to be studied. The presence of a β -lactoglobulin/kappa-casein complex has been pointed out. Some suggestions have been made for improving the accuracy of quantitative analysis. KMD

YOGHURT

- 1336 MODLER (HW) and KALAB (M). Microstructure of yoghurt stabilized with milk proteins. *J. Dairy Sci.* 66(3); 1983; 430-37
- 1337 MODLER (HW), LARMOND (ME), LIN (CS), FROEHLICH (D) and EMMONS (DB). Physical and sensory properties of yoghurt stabilized with milk proteins. *J. Dairy Sci.* 66(3); 1983; 422-9
- 1338 WISEMAN (DW) and MARTH (EH). Behaviour of aflatoxin M₁ in yoghurt, butter-milk and kefir. *J. Food Prot.* 46(2); 1983; 115-8
 Milk contaminated with aflatoxin M₁ (AFM₁) was used for preparation of yoghurt, buttermilk and kefir. Yoghurt was also prepared from skim milk alone or skim milk supplemented with 4% nonfat dry milk. During storage of yoghurt, irrespective of method of preparation, AFM₁ content showed variations. However, after six weeks at 7 C, it was almost at the same level as in milk initially. AFM₁ content of butter milk made from skim milk increased after fermentation and remained at the same level for 4 days. In a second trial, however, butter milk did not show apparent increase in AFM₁ content, but behaved like yoghurt although the apparent content was variable. AFM₁ remained stable for 2 weeks of refrigerated storage. Kefir prepared from skim milk either by low heat (64 C for 30 minutes) or high heat pasteurisation (84 C for 30 minutes), recorded increased apparent content of AFM₁. AFM₁ content of kefir, failed to return to the original level during or at the end storage at 7 C. BSN

BUTTER

- 1339 MOXON (RE). A rapid method for the determination of sodium in butter. *J. Assoc. Public. Anal.* 21(3); 1983; 83-7

Atomic absorption spectrometry has been employed for quick estimation of sodium in salted and unsalted butter. The method is accurate and the results obtained are compared with those obtained using an established technique. BSN

CHEESE

- 1340 BUSH (CS), CAROUTTE (CA), AMUNDSON (CH) and OLSON (NF). Manufacture of Colby and brick cheeses from ultrafiltered milk. *J. Dairy Sci.* 66(3); 1983; 415-21
- 1341 HOFI (AA), MAGDOUB (MNI), ABD EL-HAMID (LB) and OSMAN (SHG). A new type of semi-hard cheese from recombined milk. *J. Food Technol.* 18(6); 1983; 711-8
- 1342 ROCHE (MOG), POZO (EDEL), IZQUIERDO (L) and FONTANE (M). Nitrate and nitrite contents in Cuban cheese of the gouda type. *Nahrung.* 27(2); 1983; 125-8
- 1343 WU (HM) and PENG (AC). Production and textural properties of soy-cheese whey curd. *J. Food Sci.* 48(5); 1983; 1562-3

MEAT AND POULTRY

MEAT

- 1344 TERLIZZI (FM), PERDUE (RR) and YOUNG (LL). Processing and distribution of cooked meats in flexible films. *Food Technol.* 38(3); 1984; 67-71
- The article covers the different types of available flexible packaging, handling conditions for the production of quality product, expectation of meat processor and consumer, and packaging equipment/processing procedures used in cook-in programmes. JVS
- 1345 ANON. Canned meat in the Federal Republic of Germany. *Indian Food Pack-er.* 37(5); 1983; 16-29
- Aspects covered include, selection of trade channels, potential importers, central buying groups and large multiples, industrial users, recommendations for exporters in developing countries, trade and professional associations, imports of selected canned meat and meat products, product coverage and market profiles. BSN
- 1346 COLMENERO (FJ) and BORDERIAS (AJ). A study of the effects of frozen storage on certain functional properties of meat and fish protein. *J. Food Technol.* 18(6); 1983; 931-7
- This paper presents a study of the effects of frozen storage on certain functional properties, namely protein solubility, emulsifying capacity, and viscosity, both in meat and in fish. High correlation among the differ-

functional properties tested was found only in the case of fish. This, together with the significant variations in the viscosity values found during the storage period, suggests that the analysis of apparent viscosity is a valuable indicator method for determining alterations occurring in the functional characteristics of fish protein. AA

- 1347 DUTSON (TR). Relationship of pH and temperature to disruption of specific muscle proteins and activity of lysosomal proteases. *J. Food Biochem.* 7(4); 1983; 223-46

From a review of the literature, and from specific data presented in this paper, it was concluded that both postmortem temperature and pH have effects on meat tenderness and on disruption of specific myofibrillar proteins. Increased postmortem temperature produces more tender muscles and increases the disruption of troponin-T, myosin, Z-lines, connectin and gap filaments. Elevated postmortem temperature also increases the activity of enzymes which cause the disruption of myofibrillar proteins. Higher ultimate postmortem pH (above 6.0) produces more tender muscle, but also produces dark-cutting meat. Except for one experiment, lower pH in the first few hours postmortem (in muscle with normal ultimate pH; i.e., 5.8 or below) improves meat tenderness. High pH increases the activity of CAF and low pH increases the activity of lysosomal cathepsins. Both high and low pH increase the degradation of troponin-T, Z-lines, gap filaments and connectin, but the degradation of these proteins (except for Z-lines) is greater at a low pH. Low pH increases the degradation of myosin; conversely, high pH retards its degradation. AA

- 1348 PEARSON (AM), WOLZAK (AM) and GRAY (JI). Possible role of muscle proteins in flavour and tenderness of meat. *J. Food Biochem.* 7(4); 1983; 189-210

Evidence suggests that both the myofibrillar proteins and collagen play important roles in meat flavour and tenderness. The probable contributions of the purified proteins to flavour are reviewed in terms of their amino acid composition, especially the sulphur containing and certain other amino acids that have been implicated in meat flavour development. Myofibrils solubilized in sodium dodecyl sulphate (SDS) undergo proteolysis on warming to room temperature overnight or on storing for several days at 0-4 C as demonstrated by extra protein bands. The extra proteins appear to be due to the presence of indigenous muscle proteases. The implications of some indigenous muscle proteases are reviewed in terms of their probable role in tenderization of postmortem meat. AA

- 1349 HUBER (H). Meat pie - Production and quality. *Getreide Mehl. Brot.* 37(3); 1983; 84-9 (German)

Meat pies represent a new category of products among the ready-to-eat foods on the market. They offer almost an endless variety of products based on animal and vegetable sources of food - meat, sausages, game, fish, and vegetables - and can attain a high culinary level. Some typical recipes have been described in order to provide a stimulus to further innovations. KMD

BEEF

- 1350 YATES (LD), DUTSON (TR), CALDWELL (J) and CARPENTER (ZL). Effect of temperature and pH on the post-mortem degradation of myofibrillar proteins. *Meat Sci.* 9(3); 1983; 157-79

- 1351 WILLIAMS (JC), VIMINI (RJ), FIELD (RA), RILEY (ML) and KUNSMAN (JE). Influence of delayed bleeding on sensory characteristics of beef. *Meat Sci.* 9(3); 1983; 181-90
- 1352 MICKELSON (JR). Calcium transport by bovine skeletal-muscle mitochondria and its relationship to post-mortem muscle. *Meat Sci.* 9(3); 1983; 205-29
- 1353 MATES (A). Microbiological survey of frozen ground meat and a proposed standard. *J. Food Prot.* 46(2); 1983; 87-9
 Bacteriological examination of five hundred and nineteen samples of frozen ground beef and 172 samples of frozen ground fowl during the five year period, 1975-1980, revealed that frozen ground fowl was heavily contaminated with *Salmonella*. A standard has been proposed limiting distribution of various bacteria found in frozen ground meat. BSN
- 1354 EDWARDS (RA), DAINITY (RH) and HIBBARD (CM). The relationship of bacterial numbers and types to diamine concentration in fresh and aerobically stored beef, pork and lamb. *J. Food Technol.* 18(6); 1983; 777-88

GOAT

- 1355 OWEN (JE), ARIAS CERECERES (MT), GARCIA MACIAS (JA) and NUNEZ GONZALEZ (FA). Studies on the Criollo goat of Northern Mexico: Part 1 - the effects of body weight on body components and carcass development. *Meat Sci.* 9(3); 1983; 191-204

PORK

- 1356 VAHABZADEH (F), COLLINGE (SK), CORNFORTH (DP), MAHONEY (AW) and POST (FJ). Evaluation of iron binding compounds as inhibitors of gas and toxin production by *Clostridium botulinum* in ground pork. *J. Food Sci.* 48(5); 1983; 1445-51
- 1357 PENSABENE (JW) and FIDDLER (W). Factors affecting the N-nitrosothiazolidine content of bacon. *J. Food Sci.* 48(5); 1983; 1452-4
 The analysis of raw and cooked bacon for the presence of N-nitrosothiazolidine (NTHZ), a recently identified nitrosamine in bacon, indicated that the levels found were unrelated to residual nitrite or refrigerated storage. Raw bacon contained higher levels of NTHZ than either fried, baked, or broiled bacon. Since the total amount of NTHZ in whole raw bacon was higher than that found in fried bacon and its drippings combined, it was concluded that NTHZ was not formed during frying as is N-nitrosopyrrolidine. The presence of NTHZ in bacon appears to be associated with smoke house processing. AA
- 1358 HUHTANEN (CN). Antibotulinal activity of methyl and ethyl fumarates in comminuted nitrite-free bacon. *J. Food Sci.* 48(5); 1983; 1574-5
- 1359 MOTYCKA (RR) and BECHTEL (PJ). Influence of pre-rigor processing, mechanical tenderization, tumbling method and processing time on the quality and yield of ham. *J. Food Sci.* 48(5); 1983; 1532-6

BOAR

- 1360 LUNDSTROM (K), MALMFORS (B), FJELKNER-MODIG (S) and SZATEK (A). Consumer testing of boar meat in Sweden. *Swedish J. Agric. Res.* 13(1); 1982; 39-46

POULTRY

- 1361 PANDA (PC). Minimizing the spoilage of dressed poultry in the marketing channel. *Poult. Guide.* 20(11); 1983; 73-6
The microbial load on dressed poultry sold in Indian markets and the incidence and distribution of the micro-organisms found on the dressed birds have been reported. A few suggestions have been given for the proper packing, and cold or frozen storage of dressed poultry. KMD
- 1362 COX (NA), THOMSON (JE) and BAILEY (JS). Procedure for isolation and identification of *Salmonella* from poultry carcasses. *Poult. Guide.* 20(11); 1983; 151-64
The authors have reviewed existing procedures of *Salmonella* identification, and described, step by step, the procedure to be adopted for the isolation and identification of *Salmonella* from poultry carcasses. KMD

BROILER

- 1363 ANG (CYW) and HAMM (D). Comparison of commercial processing method vs hot-deboning of fresh broilers on nutrient content of breast meat. *J. Food Sci.* 48(5); 1983; 1543-4, 1565
Conventional commercial processing of fresh broilers usually involves ice-water immersion chilling, which may cause some losses of water-soluble nutrients. This study was conducted to determine the effect of conventional chilling vs hot deboning on the nutrient content (proximate composition, riboflavin, niacin, vitamin B₆, P, Na, Mg, Ca and K) of breast meat from broilers. Significant differences were found between the two methods when the results of moisture, ash, P, K and Na were compared. No differences were found for other nutrients. A leaching mechanism for ash, mostly of P and K salts by the commercial process is suggested. AA
- 1364 RAMAPPA (BS) and DEVE GOWDA (G). Nutritive value of broiler meat. *Poult. Guide.* 20(11); 1983; 65-7
Broiler meat is claimed to be low in calories and fat, and high in protein content. The proximate composition of broiler meat, pork, milk and eggs are compared in a table. The protein and fat contents of the meat from various poultry birds, of the edible portion of broiler meat of two different breeds (White Plymouth and White Cornish), and of various organs and parts of broilers have also been reported. KMD

EGG

- 1365 GOSSETT (PW) and BAKER (RC). Effect of pH and of succinylation on the water retention properties of coagulated, frozen and thawed egg albumen. *J. Food Sci.* 48(5); 1983; 1391-4

Egg albumen was modified to improve water retention properties of the coagulated, frozen and thawed product. Albumen was found to contribute more to expressible moisture (%EM) of coagulated whole egg mixture than yolk. For frozen and nonfrozen treatments, albumen (pH > 9.5) reduced %EM in both the coagulated albumen and whole egg mixtures made with pH-adjusted albumen. Succinylated albumen ($\geq 0.2\%$ g anhydride/g albumen) reduced %EM for frozen and nonfrozen treatments. Albumen at pH 10.5 and 11.0 required less time to attain an equivalent cook value than at pH 7.0, 8.0, 9.0 and 10.0. AA

- 1366 GOSSETT (PW), RIZVI (SSH) and BAKER (RC). Selected rheological properties of pH-adjusted or succinylated egg albumen. *J. Food Sci.* 48(5); 1983; 1395-9

Apparent viscosities of pH-adjusted or succinylated raw egg albumen were measured at 10, 20 and 30 C using a Haake rotary viscometer. Viscosities decreased with increasing temperature. Rheological power law model parameters indicated that as pH approached 5-6 and 11, albumen became more Newtonian. Control albumen (pH 9.0) and succinylated albumen were pseudoplastic. Intrinsic viscosities of pH 9.0, 10.0, and 11.0 albumens were 0.083, 0.092, and 0.102 dl/g, respectively, and that of succinylated albumens (0, 0.1, 0.2, and 0.4% w/w) were 0.052, 0.147, 0.149, and 0.184 dl/g, respectively. Apparent viscosities of coagulated albumen, measured by capillary extrusion, increased with pH but did not change with succinylation. Yield forces and rigidity moduli of these gels increased with pH but not with succinylation level. AA

- 1367 MOHR (KH). Rationalization of food manufacture by application of preserved egg products. *Lebensmittel-industrie*. 30(1); 1983; 9-12 (German)

Various methods for the preservation of eggs have been discussed, from the standpoint of energy consumption. Problems of microbial spoilage during the refrigerated storage of egg yolk and of whole egg have been discussed. An example of how spoilage can be controlled by reducing water activity has been given. KMD

SEAFOODS

FISH

- 1368 LUNDSTROM (RC) and RACICOT (LD). Gas chromatographic determination of dimethylamine and trimethylamine in seafoods. *J. Assoc. Off. Anal. Chem.* 66(5); 1983; 1158-63

Dimethylamine (DMA) as well as trimethylamine (TMA) are quality indicators of seafoods. DMA is produced by the action of an endogenous enzyme primarily in gadrid fish. TMA is produced in fresh seafoods by the action of a bacterial enzyme. A simple perchloric acid extract of fish is neutralised with KOH and extracted with benzene. The amines are separated by GC on column parked with porous polymer. Nitrogen-phosphorus-specific flame ionisation is used as the detector. The method enables simultaneous estimation of DMA and TMA. JVS

- 1369 CARDELLO (AV), SAWYER (FM), PRELL (P), MALLER (O) and KAPSALIS (J). Sensory methodology for the classification of fish according to "edibility characteristics". *Food Sci. + Technol.* 16(4); 1983; 190-94

A standardized sensory methodology for evaluating the flavour, texture, and appearance of fin fish was developed by the U.S. Army Natick Research and Development Laboratories. The ultimate goal of the project is to develop a nationwide seafood nomenclature system that is based upon similarities and dissimilarities in "edibility" characteristics among species. This new system will enable consumers and commercial processors to make informed choices among unfamiliar or nontraditional species by providing the comparative sensory data necessary to select a desired texture, flavour, etc., of fish. The present report summarizes the development of the sensory methodology and its initial application in establishing a data base on the sensory properties of traditional and non-traditional fish species. AA

- 1370 HIGHT (SC) and CAPAR (SG). Electron capture gas-liquid chromatographic determination of methylmercury in fish and shellfish. *J. Assoc. Off. Anal. Chem.* 66(5); 1983; 1121-8

Methyl mercury is isolated from acetone-washed and homogenised tissue by adding hydrochloric acid. The methyl mercuric chloride formed is extracted with benzene. The resulting extract is concentrated and analysed by EC-GLC on 5% DEGS-~~20~~ treated with inorganic mercuric chloride (quantitation limit, 0.15 to 2.48 mcg Hg/g; accuracy 99-120%). Method adapted official first action. JVS

- 1371 NIRMALA THAMPURAN, KRISHNA IYER (H) and MAHADEVA IYER (K). Effect of incubation period on plate count of raw iced and frozen fish. *Fish. Technol.* 20(1); 1983; 42-4

Raw (50 nos.), frozen (58 nos.) and iced (57 nos.) of fish samples were studied for the effect of incubation period (24, 48, 72 and 96 hours) on recovery of bacteria from these samples. Significant differences ($p < 0.01$) were found in the bacterial counts at the four periods of incubation, variation being most significant at 1% level. Incubation for 24 hours was found adequate for raw fish, while for iced and frozen fish 48 hours were required. MVG

- 1372 CHIA (SS), BAKER (RC) and HOTCHKISS (JH). Quality comparison of thermo-processed fishery products in cans and retortable pouches. *J. Food Sci.* 48(5); 1983; 1521-5

The physical, chemical and sensory properties of rainbow trout, pollock and shrimp processed at equal lethalties in cans and retortable pouches were compared at certain storage periods. Pouched rainbow trout, pollock and shrimp required respectively 34%, 32% and 37% less thermal processing time than the canned product. The pouched products had lower amounts of ammonia, trimethylamine and total carbonyl compounds than the canned products. The pouched products retained 17%, 9% and 15% more Vitamin B₁ than the canned products for rainbow trout, pollock and shrimp, respectively. Pouched products had a firmer texture and lighter colour than the canned products. In sensory evaluations, the pouched products were scored higher, in most cases, for colour, flavour and overall acceptability. AA

SARDINE

- 1373 SURENDRAN (PK) and GOPAKUMAR (K). The bacteriology of oil sardine (*Sardinella longiceps*) and mackerel (*Rastrelliger kanagurta*) from tropical waters off Cochin. II. Qualitative aspects. *Fish. Technol.* 20(1); 1983; 45-52

Of the flora of skin, gills and intestines of oil sardine and mackerel isolated at 28 ± 2 C at incubation temperature, 80% comprised the gram negative asporogenous rods of cocci belonging to the genera *Vibrio*, *Pseudomonas*, *Moraxella*, *Acinetobacter* and *Flavobacteria/Cytophaga* and 10% comprised the gram positive Micrococci and *Arthobacter*. Variations in isolation related to changes in incubation temperature were noticed. At 36 ± 1 C incubation temperature, more vibrio sp. and gram positives were recovered; at lower temperature of 8 ± 1 C and 1 ± 1 C more *Pseudomonas*, *Acinetobacter* and *Moraxella* sp. were recovered. Seasonal variations in relative distribution of different genera were also significant. MVG

TROUT

- 1374 SUTTON (JG), GOODWIN (J), HORSCROFT (G), STOCKDALE (RE) and FRAKE (A). Identification of trout and Salmon bloods by simple immunological technique and by electrofocussing patterns of red cell enzyme superoxide dismutase. *J. Assoc. Off. Anal. Chem.* 66(5); 1983; 1164-74

The immunological technique ratios on the development of a specific antitrant (Salmonidae) serum which is used initially to differentiate the blood of a Salmonidae from other fresh water fish. Further discrimination within the Salmonidae is made on the basis of the different polymorphic forms of the enzyme superoxide dismutase in a pH 2.5 to 8 gradient. Using this technique it is possible to differentiate among Salmon, sea/brown trout, char, cheetah trout and a number of varieties of rainbow trout. AA

COD

- 1375 SLABYJ (BM), KOONS (RD), BRADBURY (HE) and MARTIN (RE). Cadmium determination of frozen cod: An interlaboratory comparison. *J. Food Prot.* 46(2); 1983; 122-5

Of the eight laboratories which analysed cadmium (Cd) content (biologically bound) of frozen cod, consistent results were reported only by three laboratories. A mean Cd content of 0.323 ppm with a coefficient of variation of 38% was reported. In cod samples spiced with Cd acetate at 78 ppm level, results were better recorded. (mean 71.2 ppm, coefficient of variation 13%). More accurate results were reported by laboratories using atomic absorption spectrometry, as against those using argon plasma atomic emission spectrometry. Loss of Cd during dry ashing was partly responsible for lack of consistency in the data recorded. BSN

THREADFIN BREAM

- 1376 JOSEPH (J) and PERIGREEN (PA). Studies on frozen storage of minced fish from threadfin bream. *Fish. Technol.* 20(1); 1983; 13-6

Freshly caught threadfin bream (*Nemipterus japonicus*) were washed,

iced and kept a day in an insulated box. After head and viscera removal, the fish was minced using a Baader meat picking machine packed in polythene (150 gauge) lined waxed cartons (500 g), frozen in a contact plate freezer at -35 to -40 C, and stored at -23 C for the study. A good correlation was observed between organoleptic scores, protein extractability, drip loss on cooking and weight loss on thawing. The sensory scoring was influenced by textural and flavour changes. Loss of solubility causing texture changes, was significant during the first seven weeks of storage, but not significant during the later stage of storage. MVG

BOLTI FISH

- 1377 FARAG (RS), SEDKY (KA), TAHA (RA) and El-ZAYET (FM). Chlorotetracycline and sodium chloride treatment effects on some micro-organisms and unsaponifiables of Bolti fish fillets. *Fette Seifen Anstrichm.* 85(1); 1983; 33-8

Fillets of bolti fish (*Tilapia nilotica*) were treated with (a) chlorotetracycline (CTC), (b) brine (NaCl), or (c) a combination of CTC and NaCl, and stored under different conditions. Counts of lipolytic and psychrophilic bacteria were lowest when a combination of CTC and NaCl was used; NaCl seems to have a synergistic effect on CTC, and the combination was more effective in controlling lipolytic bacteria than in controlling psychrophilic bacteria. The hydrocarbons in fresh and stored Bolti fillets were determined. A large amount of sterols were converted to hydrocarbons in partially frozen fillets. The application of treatments (a), (b), and (c) leads, respectively, to a slight, an enormous, and a noticeable conversion of hydrocarbons to sterols. KMD

CAPELIN

- 1378 BOTTA (JR), LAUDER (JT), DOWNEY (AP) and SAINT (W). Chemical and sensory assessment of nonspawning capelin (*Mallotus villosus*) subjected to long term frozen storage. *J. Food Sci.* 48(5); 1983; 1512-5, 1536

CLARIAS LAZERA

- 1379 FATUROTU (EO). Biochemical evaluation of the nutritive quality of differently processed fish (*Clarias lazera*). *Nutr. Rep. Int.* 27(5); 1983; 1059-69

Clarias lazera (commonly known as African Catfish; locally in Nigeria as African Mudfish) was used in a study aimed at monitoring quality changes with respect to different methods of preservation namely: icing, sun drying and smoking. The moisture content, fat (ether extract), iodine value, total volatile nitrogen (TVN) and trimethylamine (TMA) were the chemical parameters employed in the quality assessment. The storage lasted for six weeks with weekly chemical assessment of the preserved samples. The method of preservation significantly influenced ($P < 0.05$) the moisture content and fat content, while it was significantly correlated to the moisture content, fat content ($P < 0.01$) and iodine value ($P < 0.05$). However, the period of storage was only significantly correlated to the iodine value ($P < 0.01$). Sun drying and smoke-curing preserved *Clarias lazera* better than frozen storage. AA

FLAT FISH

- 1380 KESHAHA (N) and SEN (DP). Proximate composition of five species of flat fishes. *Fish. Technol.* 20(1); 1983; 24-8

Different body parts of five species of flat fishes, namely *Cynoglossus semifaciatus*, *C. lida*, *C. bilineatus*, *C. macrolepidotus* and *Psettodes erumei* were analysed for proximate composition. In whole body of *C. lida* and *C. semifaciatus*, mean values (on dry basis) for moisture, protein, fat and ash were respectively, 75.9%, 75.3%, 7.1%, 16.1%, and 78.9%, 75.6%, 7.9% and 16.6%. The same values for the edible parts of *C. semifaciatus* and *Psettodes erumei* were respectively 77.3%, 80.7%, 7.8% and 10.8% and 77.4%, 86.2%, 3.5% and 11.1%. MVG

LABEO ROHITA

- 1381 RAO (SB). Denaturation of *Labeo rohita* (Rohu) actomyosin on frozen storage - preventive effect of carbohydrates. *Fish. Technol.* 20(1); 1983; 29-33

Effectiveness of carbohydrates (sucrose and glucose) in preventing denaturation of myofibrillar proteins (actomyosin) extracted pre-rigor and post-rigor fish was studied. The rate of denaturation was followed by estimating percentage salt extractability, Ca^{12+} ATPase activity and clearing response test. In all concentrations of actomyosin, glucose and sucrose exhibited cryoprotective effect and the preservative effect was better in higher concentration than in lower concentration of actomyosin. The carbohydrates preserved post-rigor protein better than pre-rigor protein. MVG

LANTERN FISH

- 1382 GOPAKUMAR (K), RAMACHANDRAN NAIR (KG), VISHWANATHAN NAIR (PG), LEKSHMY NAIR (A), RADHAKRISHNAN (AG) and RAVINDRANATHAN NAIR (P). Studies on lantern fish (*Benthosema pterotum*). 1. Biochemical and microbiological investigations. *Fish. Technol.* 20(1); 1983; 17-9

Lantern fish, an underutilised fish, caught from the Gulfs of Oman and Aden were subjected to biochemical and microbiological studies after frozen storages and found to resemble most marine fish. Its proximate composition in moisture, protein, fat and ash was comparable to other fish; the fish was a good source of Na, K and Ca with the special feature that the Na and K contents were almost identical. With regard to microbiology, native flora could not be studied as the fish was under frozen storage for long. However, the total viable count of the frozen sample was within the safe limits. No coliforms, faecal streptococci and coagulase positive staphylococci were detected. The bacteria comprised mainly of gram negative non-mobile rods identified as *Achromobacter* sp. Lipid analysis showed unsaponifiable matter to be within safe limits (4.0). The fish appeared to have undergone considerable lipid hydrolysis as evidenced by the presence of relatively high content of free fatty acids possibly due to long frozen storage. It was concluded that the fish could be processed to various edible products. MVG

- 1383 LEKSHMY NAIR (A), ARUL JAMES (M), MATHEW (PT) and GOPAKUMAR (K). Studies on lantern fish (*Benthosema pterotum*). II. Nutritional evaluation. *Fish. Technol.* 20(1); 1983; 20-23

Methods for processing of lantern fish to dried salted fish (16.7% moisture), fish meal and fish hydrolysate are reported. The conversion ratio of fish to meal (4.8:1) was comparable to that of other species of the same family. The meal had very high protein and mineral content, but the fat content is slightly more than that prescribed by the Indian standard. Better pressing and removal of stick water from cooled water eliminated this drawback. The salted and dried fish was black in colour and thus unappealing to consumers. Both the dried product and meal had good shelf life of over 6-12 months at ambient temperature (28±2 C). The hydrolysate was an extremely hygroscopic powder with golden yellow colour and had a shelf life of over 10 months in air tight containers. The amino acid composition of meal and hydrolysate was comparable to that of many other species of fish. Lysine content was adequate (7.3 g/100 g in hydrolysate), tryptophan, and tryptophan and leucine were the limiting amino acid in the hydrolysate and the meal respectively. Growth rate and PER in rats fed fish meal was comparable to those fed with casein. The meal and hydrolysate could therefore, be used as a supplement particularly in animal feeds. MVG

LIZARD FISH

- 1384 ANTONY (KP) and GOVINDAN (TK). Packaging and storage studies of dried lizard fish. *Fish. Technol.* 20(1); 1983; 34-41

Salted and dried lizard fish (*Saurida* sp.) were packed in different packaging films like low density polyethylene (LDPE) of different guages, high density polyethylene (HDPE) of 200 guage, polyvinylidene chloride (PVDC) coated 400 MXXT cellophane, polypropylene (PP) of 100 guage and LDPE of 100 guage/60 GSM paper laminate and stored at atmospheric condition (26 to 34 C and 65 to 95% RH). The samples were drawn every month and tested for moisture, JVN and organoleptic qualities. Changes in total weight of samples during storage were also noted. The film giving effective results and the above preliminary studies were again used for packaging and storage at atmospheric and low temperature and low humidity condition to confirm their suitability under these conditions. Polyethylene films of higher guages gave better results under both sets of conditions. PVDC coated cellophane was also satisfactory under low temperature and low humidity condition, but at atmospheric condition it was susceptible for insect attack. The storage life of the dried product was generally enhanced under lower temperature and humidity conditions. MVG

PROCHILODUS SCROFA

- 1385 MAIA (EL), RODRIGUEZ-AMAYA (DB) and AMAYA-FARFAN (J). Proximate, fatty acid and amino acid composition of the Brazilian fresh water fish *Prochilodus scrofa*. *Food Chem.* 12(4); 1983; 275-86

XENOMUGIL THOBURNI

- 1386 CURRAN (CA) and POULTER (RG). Isohalic sorption isotherms III. Application to a dried salted tropical fish (*Xenomugil thoburni*). *J. Food Technol.* 18(6); 1983; 739-46

SHELLFISH

- 1387 HOOD (MA). Effects of harvesting waters and storage conditions on yeast populations in shellfish. *J. Food Prot.* 46(2); 1983; 105-8

PRAWN

- 1388 CHANMUGAM (P), DONOVAN (J), WHEELER (CJ) and HWANG (DH). Differences in the lipid composition of fresh water prawn (*Macrobrachium rosenbergii*) and marine shrimp. *J. Food Sci.* 48(5); 1983; 1440-41, 1462

Total lipid content of fresh water prawn (FWP) *Macrobrachium rosenbergii* was found to be greater than that of marine shrimp (3.18 vs 1.33%). This was due to the much higher levels of triglycerides in FWP as compared to marine shrimp. The ω 6 polyunsaturated fatty acids (PUFA) predominated in FWP lipids, whereas the ω 3 PUFA predominated in marine shrimp, primarily due to the greater concentration of linoleic acid in FWP lipids (16.3 vs 2.9%). The triglycerides of both species contained considerable amounts of PUFA and FWP has a high triglyceride content. This may contribute, in part to the shorter shelf-life of *Macrobrachium* as compared to marine shrimp. AA

- 1389 PASSY (N), MANNHEIM (CH) and COHEN (D). Effect of modified atmosphere and pretreatments on quality of chilled fresh water prawns (*Macrobrachium rosenbergii*). *Food Sci. + Technol.* 16(4); 1983; 224-9

The combined effect of initial microbial count, storage temperature and CO₂ flushing of the package, on shelf life of fresh water prawns (*Macrobrachium rosenbergii*) was studied. The quality of the raw material in terms of initial microbial count and hypoxanthine value proved an important factor in controlling shelf life. Heading and intensive washing reduced the initial microbial load by about one order of magnitude. Packing in ice proved also beneficial in that it prevents desiccation and lengthens the lag phase for microbial growth from 1-2 to 5 days. A similar effect was obtained by a CO₂ atmosphere and this combined with a temperature of 4 C, extended shelf life by 2-3 days (to 8-9 days) without detriment to flavour. The best criterion for shelf life estimation was visual appearance and odour of the uncooked product, since cooking tends to remove off odours and flavours and toughen the texture. AA

PROTEIN FOODS

Nil

FRUIT JUICES AND BEVERAGES

FRUIT JUICES

- 1390 VRIGNAUD (Y). New techniques of fruit juice clarification by ultra-filtration. *Ind. Aliment. Agric.* 100(4); 1983; 245-50 (French)

Trials, over three seasons, on the clarification of fruit juices by ultrafiltration have shown that -this method has the following advantages: (i) continuous treatment of fruit juices, from pressing to concentration; (ii) reduction of treatment time from 30 hours to 2 hours for the same extraction yield; (iii) increase of juice yield due to reduction of losses; (iv) an important reduction in manufacturing cost; (v) improvement in the quality of juice concentrates; and (vi) a reduction in the initial investment cost. KMD

- 1391 TILLOTSON (JE). Aseptic packaging of fruit juices. *Food Technol.* 38(3); 1984; 63-6

The article provides a historical perspective of shelf-stable juice product, in U.S.A., and discusses the opportunities provided by aseptic technology. The developments highlighted in aseptic systems are: (a) new types of aseptic fillers, particularly systems for plastic cups; (b) development of aseptic fillers to accommodate large size aseptic container for juices; (c) faster and efficient aseptic filling equipment; and (d) new aseptic packaging materials with improved oxygen barriers as well as resistance to penetration by juice. Another new development is concerned with the improving the juice processing elements in these new aseptic systems. JVS

CRANBERRY JUICE

- 1392 SAPERS (GM), JONES (SB) and MAHER (GT). Factors affecting the recovery of juice and anthocyanin from cranberries. *J. Am. Soc. Hortic. Sci.* 108(2); 1983; 246-9

Anthocyanin recovery was unaffected by cultivars total anthocyanin content, or juice yield. Freeze thaw treatment of cranberries increased juice yield and juice anthocyanin content by 15-fold. Anthocyanin recovery could be increased by double pressing and by tissue homogenization. KAR

APPLE JUICE

- 1393 KWASNIEWSKI (R) and DRILLEAU (JF). Research on the production of a fermented beverage based on apples. *Ind. Aliment. Agric.* 100(5); 1983; 313-7 (French)

Apple juice concentrates were diluted to different specific gravities, and then fermented at two temperatures (11 C or 20 C), with the help of a dry yeast (*Saccharomyces cerevisiae*). The "ciders" so obtained showed no differences in the chemical analyses or organoleptic quality. Thus, ciders can now be prepared all the year round, independently of the external temperature. KMD

- 1394 MATTICK (LR) and MOYER (JC). Composition of apple juice. *J. Assoc. Off. Anal. Chem.* 66(5); 1983; 1251-5
Water on 93 samples of apple juice for ash, brix, sugars, minerals and some microelements. JVS
- 1395 POLL (L) and FLINK (JM). Influence of storage time and temperature on the sensory quality of single-variety apple juice. *Food Sci. + Technol.* 16(4); 1983; 215-9
Single strength juices from 5 apple varieties (McIntosh, Filippa, Mutzu, Ingrid Marie and James Grieve) and 4-fold concentrates from 2 varieties (McIntosh and Filippa) were stored for upto 12 months at 3 C and 20 C. The products underwent sensory and chemical evaluations after 6 months and 12 months storage. For storage at 3 C, no difference was noted between evaluations at 6 or 12 months. Storage at 20 C gave juices with less fruit aroma and more cooked aroma than juices stored at 3 C. While this effect was already clear after 6 months, it became even more pronounced after 12 months storage. Similarly, after 12 months, storage at 3 C vs 20 C resulted in a sizable difference in the aroma of reconstituted concentrate. Hydroxymethylfurfural (0.4-2.2 mg/l) was found only in juices and concentrates stored at 20 C. AA
- 1396 POLL (L). Influence of storage temperature on sensory evaluation and composition of volatiles of McIntosh apple juice. *Food Sci. + Technol.* 16(4); 1983; 220-23
Apple juice produced from McIntosh apples was stored at 3, 10, 20 and 30 C for 1 year. After storage, the juices were sensory evaluated (aroma profile), analyzed for volatile compounds (headspace-GC) and for hydroxymethylfurfural (HMF). The results showed that with increasing storage temperature, there was a marked fall in fruit aroma score and an increase in cooked aroma score. GC analysis showed that with storage at 30 C, the total ester content and total aldehyde content each fell to 13% of the amount present after storage at 3 C, while alcohol content only fell to 67%. The HMF content was 0.9 mg/l at 3 C and 53.0 mg/l at 30 C. AA
- 1397 RAO (MA), COOLEY (HJ) and VITALI (AA). Flow properties of concentrated juices at low temperatures. *Food Technol.* 38(3); 1984; 113-19
Juice of apple, grapes and oranges is widely consumed in United States. Their rheological properties have been presented as function of time and temperature. Data on depectinised and filtered apple/grape juices and concentrated low pulp orange juice have been presented. Rheological data at 0°C (which is very scarce) have also been included so that they can be helpful in the design of handling equipment for use at low temperatures. JVS

COCOA

- 1398 BALASIMHA (D), BHAT (NT) and BOPAIAH (BM). Comparative chemistry and microbiology of cocoa fermentation in India. *J. Plant Crops.* 11(1); 1983; 55-
Indian cocoa beans are usually acidic due to defective harvesting, fermentation and drying. An improved processing method was developed to overcome the acidity problem. Microbiological and chemical changes occurring during the processing of cocoa beans have been compared and discussed. AA

- 1399 CRESPO (S). Crystallisation test for cocoa butter, other hard butters and coatings. *Manuf. Confect.* 63(4); 1983; 53-54, 56

The modified test for cocoa butter developed by the author of the earlier reported test of C.W. Brabender, Inc., consisting of a precision curve and time and temperature recording viscosimeter system has been outlined and its operational details and procedure of test has been reported. BSN

- 1400 HO (C-T), JIN (QZ), LEE (KN), CARLIN (JT) and CHANG (SS). Synthesis and aroma properties of new alkyloxazoles and alkylthiazoles identified in cocoa butter from roasted cocoa beans. *J. Food Sci.* 48(5); 1983; 1570-71

Previous work provided evidence for the occurrence of new alkyloxazoles and alkylthiazoles in the volatiles of cocoa butter from roasted cocoa beans. The synthesis, mass spectral data and sensory properties of these compounds are reported. AA

TEA

- 1401 HAZARIKA (M) and MAHANTA (PK). Some studies on carotenoids and their degradation in black tea manufacture. *J. Sci. Food Agric.* 34(12); 1983; 1390-96

The quantitative degradation pattern of carotenoids during different stages of manufacture by both CTC and orthodox methods in nearby developed cloves have been studied. Carotenoids decreased appreciably in curling, tearing, crushing method compared to orthodox method of tea manufacture. KAR

WINE

- 1402 CRIDDLE (WJ), GOSWELL (RW) and WILLIAMS (MA). The chemistry of sherry maturation. II: An investigation of the volatile components present in "standards" sherry base wine. *Am. J. Enol. Vitic.* 34(2); 1983; 61-71

The isolation and characterisation of volatiles of sherry by employing solvent extraction, chemical fractionation, GC and GC-MS has been described. An attempt has also been made for sensory evaluation of the volatile components. BSN

- 1403 CAPUTI (A) Jr. and MOONEY (DP). Gas chromatographic determination of ethanol in wine. *J. Assoc. Off. Anal. Chem.* 66(5); 1983; 1152-7

Twelve collaborators estimated ethanol in 8 coded samples diluted 1:100 with 0.1% v/v n-butanol in water. The average reproducibility was 0.142 and repeatability 0.036. Three different columns and operating parameters were employed in the method. JVS

- 1404 De ROSA (T), MARGHERI (G), MORET (I), SCARPONI (G) and VERSINI (G). Sorbic acid as a preservative in sparkling wine. Its efficacy and adverse flavour effect associated with ethyl sorbate formation. *Am. J. Enol. Vitic.* 34(2); 1983; 98-102

Effective inhibition of yeast growth was achieved in sparkling wine prepared by Charmat method by adding 200 mg/L of sorbic acid to wine (containing 110 mg/L sulphur dioxide). However, an associated unpleasant odour suggestive of pineapple celery was found due to formation of ethyl sorbate. The product, therefore, becomes organoleptically unacceptable after storage for six months. BSN

- 1405 CABRAS (P), MELONI (M) and PIRISI (FM). The effect of clarifying substances on the content of some insecticides and fungicides in white wine. *Am. J. Enol. Vitic.* 34(2); 1983; 103-7

Of the three clarifying substances (bentonite, charcoal and K. caseinate) used in wine preparation, charcoal induced a drastic reduction (80-93%) in concentration of the insecticides (carbaryl, dimethoate and tetra chlorvinphos) and fungicides (dichlofluanid, folpet and vinclozolin), except in case of dimethoate (40%), in wine and white must. BSN

- 1406 WILLIAMS (MA), HUMPHREYS (RC) and READER (HP). The analysis of 5-hydroxymethylfurfural in port by high performance liquid chromatography. *Am. J. Enol. Vitic.* 34(2); 1983; 57-60

A reverse phase HPLC and spectrometric detection method for determination of 5-hydroxymethylfurfural in port has been outlined. This compound derived from fructose when present in significant amounts could be indicative of blending with reduced musts or caramel or of maderization. BSN

BEER

- 1407 WILDHAGEN (H). Wort boiler heat recovery by means of a vapour recompressor and an oversized external wort heater. *MBAA Tech. Quart.* 20(3); 1983; 114-8

- 1408 SUGIBAYASHI (K), SEKIYA (H) and NISHIMURA (K). Colorimetric determination of phenols in peated malts using a modified Kleber's method. *J. Inst. Brew.* 89(2); 1983; 75-80

Kleber's method was modified to determine the amount of volatile phenol compounds, that is, the peating degree of peated malt. Steam distillation was done using a specially designed apparatus directly with the malt instead of the wort. The modified Kleber's method, when compared with Macfarlane's method by quantitative analysis using gas chromatography, was more sensitive and showed higher reproducibility and accuracy. AA

- 1409 DOLAN (TCS). Determination of fermentability of unboiled malt worts. A method for use in the distilling industry. *J. Inst. Brew.* 89(2); 1983; 84-6

- 1410 DAQUINO (AJ). Modern applications for centrifuges in breweries. *MBAA Tech. Quart.* 20(2); 1983; 47-51

The principles of operation of centrifuges and the differences observed in different design types, like disc stack separators and decanter centrifuges and their applications in breweries have been described. BSN

- 1411 POWELL-EVANS (MHB). Preparation and packaging of export beers from the U.K. to the Americans. *MBAA Tech. Quart.* 20(3); 1983; 89-92

Discusses: flavour breakdown; nonbiological breakdown; danger caused by oxygen; and packaging of beer for export. BSN

- 1412 GNYP (A). The light weighting of two-piece beer cans. *MBAA Tech. Quart.* 20(3); 1983; 93-8

- 1413 OLSSON (H), PARRA (J) and RAGNO (J). Stainless steel flavour contribution to beer. *MBAA Tech. Quart.* 20(3); 1983; 102-5, 128

Citric acid, when used at 70 C (158 F) and 4% by weight concentration, chemically complexes with metallic ions on surface of stainless steel,

thereby sequestering the metallic ion chelates. By rinsing, soluble chelates are removed rendering the stainless steel surface passivated for more than 70 days without picking up metallic flavour. BSN

- 1414 HALEY (J) and PEPPARD (TL). Differences in utilisation of the essential oil of hops during the production of dry-hopped and late-hopped beers. *J. Inst. Brew.* 89(2); 1983; 87-91

Beers prepared by using late hops and dry hops were examined for their volatile components by GC-MS. It was confirmed that most of the hop oil added towards the end of boiling stage is lost by evaporation. Part of the remaining material after water gets chemically transformed by yeast during fermentation. Dry hopped beer showed more compounds present in the original hop oil than in the later-hopped beer. By column chromatography on alumina-silica, a liquid carbon dioxide extract of hops, rich in essential has been fractionated, which simulate either later-hop or dry hop character. BSN

RUM

- 1415 FAHRASMANE (L), PARFAIT (A), JOURET (C), GALZY (P) and PAGE (E). Study of the volatile acidity of rums from the French Antilles. *Ind. Aliment. Agric.* 100(5); 1983; 297-301 (French)

Various types of rums produced in the French Antilles have been analyzed. Various parameters influenced the qualitative and quantitative composition of volatile fatty acids of different rums, namely: the raw material use (whether cane juice, molasses, or molasses residue); the micro-organisms used in the fermentation (yeasts, bacteria); and the conditions of distillation and conservation. KMD

OILS AND FATS

- 1416 KHAN (LM) and HANNA (MA). Expression of oil from oilseeds. A review. *J. Agric. Eng. Res.* 28(6); 1983; 495-503

Discusses: expression techniques; prepressing operations; and pressing operations. BSN

- 1417 MIN (DB) and WEN (J). Effects of dissolved free oxygen on the volatile compounds of oil. *J. Food Sci.* 48(5); 1983; 1429-30

The effects of 2.5, 4.5, 6.5, and 8.5 ppm dissolved free oxygen on volatile compounds formation and dissolved free oxygen disappearance in oils during storage were studied. The amount of compounds formed in oil containing 8.5 ppm was double that in oil containing 2.5 ppm oxygen. The rate of oxygen disappearance in oil containing 8.5 ppm was three times as fast as that in oil containing 2.5 ppm oxygen. The rates of dissolved oxygen disappearance and formation of volatile compounds were significantly different for the four levels of dissolved oxygen ($P < 0.05$). As the initial oxygen concentration in oil increased, the rate of oxygen disappearance and the amount of compounds formed increased. The results indicate that the formation of volatile compounds in oil during storage can be minimized by lowering the oxygen content. AA

- 1418 PARDUN (H). Fifty years of experience in Vegetable Oils and Fats Technology - A report of experiences. *Fette Seifen Anstrichm.* 85(1); 1983; 1-18 (German)
Lecture delivered by the author: a) influence of solvent composition on benzene loss and hydrocarbon retention in the oil-cake; (b) improvement of the lecithin removal process; (c) total desliming of extracted oils and its influence on raffinate quality; (d) determination of refining loss and estimation of quality of raw and refined oils; (e) comparison of various alkali neutralization methods; (f) relations between bleaching earth activity and oxidation stability of oils (g) recovery of oil from used bleaching earth; (h) distillative neutralization; (i) determination of optimal deodorising conditions; and (j) opewal fats obtained by hydrogenation, inter-esterification, or fractionation. KMD
- 1419 YAZICIOGLU (T) and KARAALI (A). On the fatty acid composition of Turkish vegetable oils. *Fette Seifen Anstrichm.* 85(1); 1983; 23-9
Olive, sunflower, and cottonseed oils account for 97% of the edible oil produced in Turkey. The next important group consists of sesame, poppy, linseed, hempseed, rape, soyabean, safflower, castor bean, and groundnut oil. The third group is made up of non-traditional sources like tobacco seed, grape seed, scabious, fig seeds, tomato seed, laurel seed, *Pistacia terebinth* seeds, rice bran, maize germ, aniseed, peach stone, and pumpkin seed oils. Finally, there are the oils from hazelnuts, walnuts, almonds, and pistachio nuts, which are of great importance in Turkey. The production of these oils in Turkey, and their fatty acid compositions have been reported. KMD
- 1420 LAMBELET (P). Comparison of NMR and DSC methods for determining solid content of fats. *Food Sci. + Technol.* 16(4); 1983; 200-202
For cocoa butter and for its admixtures with milk fat in stable polymorphic phases, differential scanning calorimetry (DSC) consistently gives higher Solid Fat Index (SFI) values than low resolution pulsed nuclear magnetic resonance (NMR) spectroscopy. This (not being supported by theoretical considerations) is attributed to the presence of an amorphous phase in the fats. Contrary to such mixtures which show a complex relationship between DSC and NMR measurements, the relationship for cocoa butter alone is linear. This can be related to the difference in the chemical composition of the fats. AA
- 1421 GERE (A). Study of some factors affecting frying fat deterioration. *Fette Seifen Anstrichm.* 85(1); 1983; 18-23
Heating and frying experiments were conducted in the laboratory to study the changes occurring during the degradation of frying fats. Under severe conditions of heating and frying, there is not only an increase in the rate of formation of decomposition products, but also the formation of a polar fraction that is more markedly deteriorated. Effects of frying temperature, intermittent use of the oil, surface/volume ratio, and frying with addition of fresh oil were also studied, and numerical data obtained. The results may be of some use in adjusting the optimal frying conditions so that the duration of time for which a particular batch of oil is suitable for frying may be extended. KMD
- 1422 McBRIDE (RL) and RICHARDSON (KC). Sensory assessment of the shelf-life of polyunsaturated margarine. *Food Sci. + Technol.* 16(4); 1983; 198-9

A commercial polyunsaturated margarine without antioxidant was evaluated by a consumer-type sensory panel. Two weeks after manufacture, then stored at -30, 5, or 10 C and further assessed at 2,4,6,8, and 12 months. Although the sensory properties of the margarine were adversely affected by all the storage treatments, both the nature and rate of deterioration varied with storage temperature. All the samples were still acceptable at the end of the experimental studies. AA

SPICES AND CONDIMENTS

- 1423 MULIYAR (MK). Transfer of technology in plantation crops. *J. Plant Crops*. 11(1); 1983; 1-12

PEPPER

- 1424 RAMADAS BHAT (U) and THARANATHAN (RN). Physico-chemical properties of black pepper starch. *Starch*. 35(6); 1983; 189-92

Unusually small-sized (2-2.5 μ) starch granules were isolated from black pepper (*Piper nigrum*) in 25-38% yield. The granules having an amylose content of 18% were non-ionic in nature and exhibited low solubility and low swelling power in water, but high solubility in DMSO. The amylogram peak viscosity of the starch was about 530 B.U. with a very little set back (~550 B.U.) on cooling, indicating a stable linear molecule very strongly associated with amylopectin. X-ray power pattern revealed the starch granules to be of A-type. AA

- 1425 CURL (CL) and FENWICK (GR). On the determination of papaya seed adulteration of black pepper. *Food Chem*. 12(4); 1983; 241-7

Papaya seed contains benzyl glucosinolate and the determination of this compound using gas chromatography or indirectly by measuring the glucose which is quantitatively released following enzymic treatment gives an indication of the contamination of pepper seed with papaya seed. The method allows detection of 0.1% papaya seed contamination/adulteration. KAR

PICKLE

- 1426 KARKI (T), ITOH (H) and KOZAKI (M). Chemical changes occurring during Gundruk fermentation part II. 2. Flavour components. *Food Sci. + Technol*. 16(4); 1983; 203-8

Gundruk is a famous Nepalese unsalted pickle especially made from mustard, rape, radish and cauliflower. The changes in flavour components of mustard vegetable during Gundruk fermentation along with the cauliflower Gundruk have been investigated. Flavour components from vegetables and pickles were extracted with ether-pentane and identified with the relative retention times of pure compounds by GC-MS. Of the flavour volatiles, ethanol and unknown peak 69 remarkably decreased, whereas 4-methylthiobutyl isothiocyanate was completely lost by fermentation in the mustard Gundruk. The major flavour components of mustard Gundruk comprised of 1-butyl cyanide, phenyl acetaldehyde, 2-phenylethyl cyanide, 2-phenylethyl isothiocyanate and 5-methylthiopentyl isothiocyanate. The principal flavour components of

cauliflower Gundruk were identified as 2-phenylethanol-, 3-hydroxy, 2-butanone, 2-octanol and 2-pentanol. The flavour volatiles of the Japanese pickles - Takanazuke and Nozawanazuke were compared with Gundruk as these pickles are also lactic fermented. AA

SENSORY EVALUATION

- 1427 PRZYBYLA (A). Sensory testing: The key ingredient in successful product development. *Process. Prep. Food.* 152(1); 1983; 117-20
Discusses the role of sensory evaluation from the concept stage of a new product to the product testing improvement level. The various types of sensory tests used have been briefly dealt with. BSN
- 1428 JAUBERT (JN). On some interesting points of recognition tests. *Ind Aliment Agric.* 100(4); 1983; 253-4 (French)
By a simple demonstration, the author has brought into question the hasty conclusions that one risks drawing from the results of tests consisting in asking a panel, or a population sample, to identify foods from a deliberately restricted number of criteria. The non-recognition of a whole set of properties on the basis of one single property should not create a doubt regarding the person's capacity to correctly identify the whole set or ensemble. KMD
- 1429 SHOEMAKER (CF) and FIGONI (PI). Time-dependent rheological behaviour of foods. *Food Technol.* 38(3); 1984; 110-12
Flow properties depend upon time and shear rate in some foods, concentrated emulsions, sols and gels exhibit this time dependency. The relationship of shear stress, shear rate and time are discussed. JVS

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

- 1430 DORING (U). Differential colouration (or staining), of insect fragments in plant products - Filth test. *Gordian.* 83(6); 1983; 119-120 (German)
A method of differential staining of plant products with chitin is described. It is based on the formation of a lacquer by the chrome pigment "Diamond Chrome Pure Blue B", and of molecule aggregates and van der Waals' bonds of the xanthene pigment "Phloxin B", with the molecular chains of chitin. The method is intended for the purpose of working out standards for the characterization and quantitative estimation, keeping in view the statistical aspects and the setting up of reference samples. KMD
- 1431 RIPLEY (BD) and BRAUN (HE). Retention time data for organochlorine, organophosphorus, and organonitrogen pesticides on SE-30 capillary column and application of capillary gas chromatography to pesticide residue analysis. *J. Assoc. Off. Anal. Chem.* 66(5); 1983; 1084-95

Relative retention time data, using a 15 m SE-30 capillary GC column have been reported for 194 pesticides under one time-temperature programmed regime. The performance of EC and nitrogen phosphorus thermionic detectors has been discussed. JVS

BIOCHEMISTRY AND NUTRITION

- 1432 MURANYI-SZELECZKY (A). The average intake of Cu, Mn and Zn micronutrients of the population of Hungary in 1978. *Acta Aliment.* 12(3); 1983; 223-7
- 1433 ALEXANDER (AR), WHANGER (PD) and MILLER (LT). Bioavailability to rats of selenium in various tuna and wheat products. *J. Nutr.* 113(1); 1983; 196-204
- In this experiment, protein source was torula yeast with Selenium (Se) supplied by either raw, precooked or canned tuna, or whole wheat flour, whole wheat bread or bran. Each Se source was fed at 0.05, 0.10 and 0.15 ppm. The results indicated that Se in wheat was more available, than that in tuna and food processing does not appear to affect Se availability. KAR
- 1434 MOHAN (PF) and NARASINGA RAO (BS). Adaptation to underfeeding in growing rats. Effect of energy restriction at two dietary protein levels on growth, feed efficiency, basal metabolism and body composition. *J. Nutr.* 113(1); 1983; 79-85
- 1435 LINA (S) and REDDY (PR). Evaluation of the protein quality of food mix in albino rats. *Nutr. Rep. Int.* 27(4); 1983; 681-7
- Food mixes comprising ragi, wheat, horsegram, plantain, tapioca and dry fish powder were 53-80% as efficient as shown milk powder when fed to albino rats. Mixes containing fish powder was always superior to other mixes. KAR
- 1436 GHEORGHE (V), MANEA (M) and SOLOMON (M). Evaluation of nutrient value and a classification of food products of animal origin in accordance with re-considered water/protein ratio. *Nahrung.* 27(2); 1983; 119-23
- 1437 KABIR (H), LEKLEM (J) and MILLER (LT). Measurement of glycosylated vitamin B₆ in foods. *J. Food Sci.* 48(5); 1983; 1422-5
- To examine the levels of glycosylated vitamin B₆ in 22 foods, each food was stirred for 2 hours at pH 6.8 and then incubated for 2 hours at pH 5.0 and 37 C with β -glucosidase (60 units per g food). Vitamin B₆ content of foods was measured microbiologically before and after enzyme treatment as well as with acid hydrolysis. Animal products contained no measurable amount of glycosylated B₆. Grains and legumes generally had a high level of this bound form (6-57% of the total vitamin B₆). Of the fruits analyzed, orange juice had the highest level of glycosylated vitamin B₆ (47%). Among fresh vegetables studied, raw carrots had the highest level (51%). For broccoli and cauliflower, the glycosylated value was higher for the processed food as compared to the raw food. AA
- 1438 BUENO (MP) and VILLALOBOS (MC). Reverse phase high pressure liquid chromatographic determination of vitamin K₁ in infant formulas. *J. Assoc. Off. Anal. Chem.* 66(5); 1983; 1063-6

The vitamin is extracted with glass-distilled η -pentene, the extracts washed with water, organic phase dried over sodium sulphate and evaporated to dryness at 40 C under reduced pressure. The residue is dissolved in hexane, made up to 15 ml and then evaporated to 1 ml. Chromatography should be carried out on the same day employing methyl-acetonitrile-tetrahydrofuran-water (39+39+16+6) as mobile phase and a μ Bondapak C₁₈ column with detection at 254 nm. Recovery of vitamin K₁ added to 5 infant formulae ranged from 84 to 103%. JVS

- 1439 METCOFF (J). Nutrition and the development of the child. *Nahrung*. 27(2); 1983; 183-9

TOXICOLOGY AND HYGIENE

- 1440 ENGST (R), LAUTERBACH (K), KONIG (R) and BECKMANN (G). Studies on the contamination of foods and feeding stuffs from selected areas of the district of Erfurt with lead and cadmium. Part III. On the burden in the commercial stock of agricultural enterprises in the effective range of a lead emitter as compared to a control area. *Nahrung*. 27(2); 1983; 147-63 (German)
- 1441 SINHA (RP) and PARULEKAR (MR). Effect of mammalian tissues on mutagenicity of several N-nitroso compounds. *J. Food Prot.* 46(2); 1983; 109-14, 118
- 1442 SPERBER (WA). Influence of water activity in food borne bacteria - a review. *J. Food Prot.* 46(2); 1983; 142-50
- Discusses: influence of water activity on bacterial growth; mechanism of resistance to reduced water activity; influence on survival in foods; interaction with other preservative factors; and considerations with intermediate-moisture and high moisture shelf-stable foods. BSN
- 1443 GRISCHY (RO), SPECK (RV) and ADAMS (DM). New media for enumeration and detection of *Clostridium sporogenes* (PA3679) spores. *J. Food Sci.* 48(5); 1983; 1466-9
- Modified PA3679 agar, (MPA3679A) was formulated as a plating medium to provide improved recovery of *Clostridium sporogenes* Putrefactive Anaerobe (PA) 3679 spores. A comparative study of MPA3679A and two currently used plating media. Yeast extract agar (YEA), and Peptone trypticase agar (PTA), showed that MPA3679A was superior for the recovery of heat activated and heat stressed spores. Further, when this medium was altered for use as an inoculated pack subculture medium, recovery of severely heat stressed spores was superior to that in the previously recommended PA3679 agar, also known as T-Best. AA
- 1444 SMITH (JL), BENEDICT (RC) and PALUMBO (SA). Relationship of water activity to prevention of heat injury in *Staphylococcus aureus*. *Food Sci. + Technol.* 16(4); 1983; 195-7

GENERAL

- 1445 RAMA RAO (A). Village and small industries in the five year plans. *Khadi-gramodyog.* 30(3); 1983; 131-5
- 1446 MANRAI (ML) and BHATNAGAR (DS). Food strategy for the eighties. *Kurukshetra.* 32(3); 1983; 22-6
- 1447 DARRINGTON (H). New uses for biotechnology. *Food Manuf.* 58(10); 1983; 65, 67, 71
- Discusses: state of the art; crop interconversion; dairy products; modification of lactose; protein modification; and danger in the EEC. BSN

FOOD PROCESSING AND PACKAGING

- 1448 BALDWIN (RE). Microwave cooking: an overview. *J. Food Prot.* 46(3); 1983; 266-91
- Discusses: microwave - definition and capabilities; effects on food ingredients; controversy regarding trichinae; microbiological aspects; energy saving aspects; federal regulations; microwave ovens vs cardiac pace makers; and trends for the future. BSN
- 1449 NAVEH (D), KOPELMAN (IJ) and PFLUG (IJ). The finite element method in thermal processing of foods. *J. Food Sci.* 48(4); 1983; 1086-93
- A variational finite element approach using triangular simplex and 2nd order quadrilateral elements was employed to analyze several problem areas that are of practical importance in the thermal processing of conduction heating products: (1) A method was developed to calculate conversion factors for thermal process design applicable to glass jars filled with conduction heating products. (2) The over-shooting of temperatures after steam-off was studied, indicating that not including the contribution of over-shooting to sterilization values in process design, can lead to gross overprocessing. (3) A method of correcting sterilization values to account for harmonious fluctuations in retort temperature was developed. (4) The air cooling of cans by natural convection was analyzed. AA

PACKAGING

- 1450 NARESH (R), GOWRAMMA (RA), MAHADEVIAH (M) and AMANDASWAMY (B). Suitability of tin free steel container for canned processed food products. *Indian Food Packer.* 37(3); 1983; 56-64
- Commercially important processed foods and their products ((i) potato, (ii) cabbage, (iii) ivy gourd (Kundri), (iv) mango juice, (v) milk powder, and (vi) frozen fish) were canned in tin free steel (TFS) cans. At ambient temperature (25-28 C) and at 37 C and based on physicochemical and organoleptic evaluation studies, (v) and (vi) were found acceptable upto 12 months. (i), (ii) and (iii) were found acceptable upto 6 months at 25-28 C. (iv) packed in cans with tinplate body and TFS ends could be stored for 12 months at both the temperatures with the products retaining the acceptable parameters. BSN

- 1451 DAVIS (DR) and BREEDLOVE (AL). Effect of selected organic acids on the pitting of tinplate cans in model systems. *J. Food Sci.* 48(4); 1983; 1148-50, 1156
 A model system of six organic acids found in green beans was prepared using two acid concentrations, two pH ranges, and two nitrate concentrations packed in conventional and double reduced tinplate cans. Can pitting severity was determined after 6- and 12- month storage periods. The pH increased with storage, but type of acid was more important than concentration and pH on pitting severity. The composite treatment of all six acids gave the lowest can pitting severity. Each acid treatment had a different can pitting profile. The can type was the most important factor affecting can pitting. AA
- 1452 HUANG (F) and HAYAKAWA (K-I). A deviant heat process applied to canned or packaged liquid food. *J. Food Sci.* 48(4); 1983; 1229-34, 1241
 A new procedure was developed for predicting the correction factor of a deviant thermal process applied to canned or packaged convention heating food. This development was accomplished through a combined application of a mathematical model for estimating process lethality and statistical procedures. Through a dimensional analysis of the mathematical model it was found that there were nine independent dimensionless parameters required to define uniquely correction factors. The influence of each parameter was determined by applying a statistical design of screening tests. Of the nine dimensionless parameters, only two parameters, which contained a magnitude of drop in heating medium temperature, duration of this drop, the slope index of thermal death time curve, and the slope index of heating curve influenced significantly the correction factor. Those of no significant influence included initial food temperature, retort temperature, cooling water temperature drop location, and normal processing time. A simple polynomial equation was obtained for predicting the correction factor by applying a central composite design of experiments and a statistical regression analysis. The reliability of this equation was verified through heat transfer experiments by using canned distilled water, 0.1% bean gum aqueous solution, and tomato juice.
- 1453 GODDARD (R). The art of packaging. *Food Manuf.* 58(11); 1983; 30-34
 Discusses: briefs for pack design; design opportunities; new materials; new packs; and new processes. BSN
- 1454 HINE (D). Computers in packaging. *Food Manuf.* 58(8); 1983; 24-6
- 1455 ANON. Recent trends in development of goods and packaging designs for the marketing strategy in Japan. *Packag. Jpn.* 4(13); 1983; 32-40
 Discusses: one-way containers in beverage packaging; high-quality packaged products; development of fresh and tight foods; identification through proposal-type products; identification through convenience and assortment; characterization through emotional expression; and thorough going price oriented products or trade-off goods. BSN
- 1456 ANON. Problems of packaging wastes in Japan. *Packag. Jpn.* 4(13); 1983; 40-43
 Reports on start of a model business by the Saitama prefectural government and discusses promotion of counter measures for the disposal of empty cans by local governments (Nagoya city). BSN

- 1457 ANON. Standing pouches in Japan - as star packages in the packaging strategy. *Packag. Jpn.* 4(15); 1983; 33-40

FOOD ENGINEERING AND EQUIPMENT

- 1458 AMAR SINGH and YATINDER SINGH. High capacity rotary screen grain pre-cleaners. *Invent. Intell.* 18(4); 1983; 152-4

- 1459 GARG (HP) and BANDYOPADHYAY (B). Controlled solar drying of agricultural produce by farmers. *Invent. Intell.* 18(4); 1983; 155-8

- 1460 BERRY (MR) Jr. Prediction of come-up time correction factors for batch-type agitating and still retorts and the influence on thermal process calculations. *J. Food Sci.* 48(4); 1983; 1293-9

A come-up time correction factor for 42% has been traditionally accepted for thermal processing, and was found to be applicable for model food^s heated in cans in a Steritort and a still retort when the retorts were heated to processing temperature with a constant rate of temperature rise. Correction factors were larger when both retorts were heated with an initial rate of temperature rise faster than linear heating. A 77% correction factor was measured during Orbitort processing, and was more conservative for predicting processing time than assuming 42%. Product initial temperatures of 70 and 160 F resulted in correction factors of 70 and 45% when the still retort was heated linearly, and reached 83 and 69% with normal venting. The experimental procedure for predicting the come-up factor does not require instantaneous retort heating as a baseline for comparison. AA

- 1461 VAZQUEZ (A) and CALVELO (A). Modeling of residence times in continuous fluidized bed freezers. *J. Food Sci.* 48(4); 1983; 1081-5

A longitudinal dispersion model is proposed for analyzing the movement of peas along continuous fluidized bed freezers. By comparing the model with experimental data, a dispersion coefficient is obtained which correlates satisfactorily with the bed height and the superficial air velocity. Thus, minimum residence times can be predicted in terms of bed dimensions and operating conditions in the fluidized freezer. By adapting an individual particle model for freezing time prediction to the existing conditions in fluidized bed freezers, the analysis of production rate in terms of design parameters is performed. Thus, an optimum bed height which maximizes the production rate per unit of grid area is obtained. AA

- 1462 MORRIS (N). Filtration in the food industry. *Food Manuf.* 58(7); 1983; 43-6

Discusses the advantages and savings in costs involved by the use of ultrafiltration techniques in dairy industry. BSN

- 1463 ANON. Cask and keg cleaning, filling and handling, and dispense equipment. *Int. Bottler Packer.* 57(2); 1983; 20,22 24,26,28,30-31

- 1464 SRIVASTAVA (BP). Magan choola: A smoke-free cooking oven. *Khadigramodyog.* 30(4); 1984; 190-94

- 1465 ROSE (DJ) and JEWELL (K). How to measure gas in food. *Food Manuf.* 58(10); 1983; 59,61

In order to detect undesirable chemical changes leading to deterioration of processed foods, an apparatus designed along with its operational details has been discussed. This machine enables measurement of gas in food containers. BSN

ENERGY IN FOOD PROCESSING

- 1466 BHATTACHARYA (KN). Bioenergy - the energy for the future. *Invent. Intell.* 18(4); 1983; 136-41
- 1467 BHATTACHARYA (KN). Bioenergy - the energy for the future. 5. Bioenergy conversion technologies: combustion processes. *Invent. Intell.* 18(8-9); 1983; 339-42
- 1468 GARG (HP). Solar energy storage using salt-hydrate materials. *Invent. Intell.* 18(8-9); 1983; 366-8
- 1469 KRUG (HJ). Possibilities of energy saving with vapour or hot water producers. *Fette Seifen Anstrichm.* 85(5); 1983; 199-200(German)

FOOD CHEMISTRY AND ANALYSIS

- 1470 CORI (O). Enzymic aspects of the biosynthesis of monoterpenes in plants. *Phytochemistry.* 22(2); 1983; 331-41
- 1471 ITO (T), CASSENS (RG), GREASER (ML), LEE (M) and IZUMI (K). Lability and reactivity of nonheme protein-bound nitrite. *J. Food Sci.* 48(4); 1983; 1204-7
- Nitrite treated nonheme protein was separated from the free nitrite of the reaction mixture by Sephadex G-15 column chromatography. Spectral analysis (absorbance at 330 nm) indicated that tryptophyl residues of the protein had been modified with the NO group. The protein-nitrite complex was not stable, decomposing faster at lower pH and higher temperature. As the extent of the decomposition increased with time, an increasing amount of nitrite was detected by the AOAC method, indicating that the Griess reagent reacted with nitrite after it was regenerated from the NO group. When myoglobin was incubated with the nitrosated protein, nitrosyl hemochrome could be extracted from the reaction mixture in the presence of ascorbic acid. The results indicate the potential reversibility of the protein-nitrite reaction.
- AA
- 1472 EVANS (WJ), JACKS (TJ) and McCOURTNEY (EJ). The interaction of zinc ion with phytic acid. *J. Food Sci.* 48(4); 1983; 1208-10
- 1473 GORMAN (JE) and CLYDESDALE (FM). The behaviour and stability of iron-ascorbate complexes in solution. *J. Food Sci.* 48(4); 1983; 1217-20, 1225
- The thermodynamic stability constants for ferric and ferrous ascorbate complexes, change in net redox potential with pH, and efficacy of bathophenanthroline as an iron reagent in the presence of ascorbate were determined. The stability constants for the ferric and ferrous ascorbate complexes were

found to be in the range 1.90×10^3 to 2.61×10^4 and 7.69×10^{-3} to 6.95×10^{-2} , respectively. The stability of ferric ascorbate over a wide range of pH values suggests its potential use as an iron additive in foods. Redox potential decreased with an increase in pH. Bathophenanthroline analysis of these solutions for free iron proved to have limitations in the presence of ascorbate. AA

- 1474 WALTER (RH) and SHERMAN (RM). The induced stabilization of aqueous pectin dispersions by ethanol. *J. Food Sci.* 48(4); 1983; 1235-7, 1241

- 1475 GODSHALL (MA). Interference of plant polysaccharides and tannin in the Coomassie blue G250 test for protein. *J. Food Sci.* 48(4); 1983; 1346-7
Coomassie Blue G250, a quantitative colour reagent used for protein analysis, reacts with tannin and polysaccharides found in cane juice and raw cane sugar. For this reason, the dye could not be used as a reagent for protein in these products. However, spectroscopic data showed that the complex formed with phenolic compounds possessed a different maximum than the protein complex. The spectrum of the complex between the dye and the nondialyzable fraction from raw sugar indicated the presence of phenolic moieties attached to this high-molecular weight fraction. The reaction of several common plant polysaccharides and tannins with the dye could constitute a serious source of error in its use to determine protein in plant extracts. AA

- 1476 CHIRIFE (J), BOQUET (R), FONTAN (CF) and IGLESIAS (HA). A new model for describing the water sorption isotherm of foods. *J. Food Sci.* 48(4); 1983; 1382-3

This work investigated the applicability in the food area of a new sorption equation recently developed by Ferro Fontan et al. (1982). The equation may be written, $\ln(\gamma/a_w) = \alpha (m)^{-r}$, where, γ , α and r are parameters to be determined, m is the moisture content, and a_w is water activity. It was found that the three parameter equation is able to describe the water sorption isotherm of 18 different foods in an extensive range of a_w (up to about 0.95) with only 2-4% error (average) in the predicted moisture contents. Foods examined comprised, among others, oilseeds, starchy foods, and proteins. AA

- 1477 ALZAMORA (SM) and CHIRIFE (J). The water activity of canned foods. *J. Food Sci.* 48(4); 1983; 1385-7

- 1478 CRISTAL (MJ). Applications of ion-exchange in the food industry. *Chem. Ind.* 21; 1983; 814-7

Discusses: softening, calcium exchange and deacidification; demineralisation and deashing; dealkalisation and demineralisation; decolourisation; specialist ion-exchange resins; and hydroponics. BSN

- 1479 LEE (K) and ABENDROTH (JA). High performance liquid chromatographic determination of phytic acid. *J. Food Sci.* 48(4); 1983; 1344-5

Phytic acid was quantified using a tetrabutylammonium-formate ion pair on an octadecyl column in HPLC. Unlike previous methods, phytic acid eluted significantly later than the dead volume. Good separations were possible with a linear response up to 40 micrograms and a sensitivity of 0.002 micrograms phytic acid. Results with this method are compatible with conventional methods for phytic acid. AA

- 1480 BARKER (PE) and THAWAIT (S). Separation of fructose from carbohydrate mixtures by semi-continuous chromatography. *Chem. Ind.* 21; 1983; 817-21
Discusses: historical development; developments in continuous chromatography; description of the equipment; principle of the operations of the unit; experimental programme and results; semicontinuous runs with Pisons synthetic feed; and mathematical modelling of the unit. BSN
- 1481 SNYDER (J) and FRANKO-FILIPASIC (B). The analysis of glycerol by gas chromatography. *J. Am. Oil Chem. Soc.* 60(7); 1983; 1269-70

FOOD LAWS AND REGULATIONS

- 1482 MILLAR (JR). Impact of food and drug legislation in the USA on the use of ion-exchange resins in food processing. *Chem. Ind.* 21; 1983; 804-9
Discusses: definitions; application of the law to ion-exchangers and sorbents; extraction process; sorbent approval; toxicology and Delaney clause; advantages and disadvantages of using ion-exchange resins and toxicity involved; and investigations of solubility. BSN

FOOD MICROBIOLOGY

- 1483 LEWIN (RA). Phycotechnology - how microbial geneticists might help. *Bio-science.* 33(3); 1983; 177-9
- 1484 MACDONELL (MT). Rapid estimation of most probable number with a hand-held calculator. *Can. J. Microbiol.* 29(5); 1983; 621-3

FERMENTATION

- 1485 GUERAIN (J), COGNAT (P-O) and MIMAULT (P-A). Continuous chemical reduction of acetaldehyde into alcohol during distillation. *Ind. Aliment. Agric.* 100(7-8); 1983; 515-8 (French)
The separation of aldehydes from alcohol in a distillation column is commonplace in the potable alcohol industry, and the aldehyde residue amount to only 0.2 g/hl of pure alcohol. But special measures are to be taken to remove even this small residue - e.g., recycling into alcoholic fermentation. A suitable reducing agent, namely sodium boron hydride, has at last been found that will reduce acetaldehyde to ethyl alcohol. Although its use would not be justified for the production of potable rectified spirit, it would be very much needed for the production of crude ethanol which has to be used as motor fuel. KMD

SINGLE CELL PROTEIN

- 1486 TUSE (D). Single-cell protein: Current status and future prospects. *CRC Crit. Rev. Food Sci. Nutr.* 19(4); 1984; 273-325
Discusses: background; feed stocks; nutritional and safety considerations; SCP process technology; and the future of SCP. BSN

YEAST

- 1487 GOTO (S) and OGURI (H). Two new species of the genus *Candida* from wild grapes. *J. Gen. Appl. Microbiol.* 29(2); 1983; 85-90
- 1488 MISRA (S), GHOSH (A) and DUTTA (J). Production and composition of microbial fat from *Rhodotorula glutinis*. *J. Sci. Food Agric.* 35(1); 1984; 59-65
 The oil produced (54% on dry weight basis) by a new strain of *Rhodotorula glutinis* grown on molasses was found to contain 37% palmitic acid, 47% oleic acid and 8% linoleic acid. The major sterols consisted of 42% campesterol and 27% stigmasterol. Major hydrocarbons were n-C₂₃ (37%), iso C-29(30%) and n-C₂₁(19%). JVS
- 1489 YOON (SH) and RHEE (JS). Lipid from yeast fermentation: Effects of cultural conditions on lipid production and its characteristics of *Rhodotorula glutinis*. *J. Am. Oil Chem. Soc.* 60(7); 1983; 1281-6

FUSARIUM SOLANI

- 1490 CHANDER (H) and KLOSTERMEYER (H). Production of lipase by *Fusarium solani* under various growth conditions. *Sci. Aliment.* 3(2); 1983; 279-85

COLIFORMS

- 1491 FIRSTENBERG-EDEN (R) and KLEIN (CS). Evaluation of a rapid impedimetric procedure for the quantitative estimation of coliforms. *J. Food Sci.* 48(4); 1983; 1307-311
 A selective coliform medium (CM), developed for the impedimetric detection of coliforms, produced better impedance signals than conventional media. The selectivity of CM was better than that of lauryl tryptose broth (LTB) and violet red bile agar (VRBA). The applicability of CM to the quantitative impedimetric detection of coliforms in meat was tested and compared with most probable number and VRBA plate counts. Approximately 90% of the typical VRBA colonies did not produce gas when tested in brilliant green bile broth (BGB). Therefore, the VRBA counts were corrected by the percentage of colonies which produced gas in BGB for each sample. A correlation coefficient of 0.90 was obtained between the impedimetric test and corrected VRBA plate counts using a combined total of 91 meat samples tested by two different laboratories. AA

LEUCONOSTOC OENOS

- 1492 KOLE (M), ALTOSAAR (I) and DUCK (P). Effect of vitamin supplements on growth of *Leuconostoc oenos* 44.40. *J. Food Sci.* 48(4); 1983; 1380-81

STAPHYLOCOCCUS

- 1493 HOOVER (DG), TATINI (SR) and MALTAIS (JB). Characterization of staphylococci. *Appl. Environ. Microbiol.* 46(3); 1983; 649-60

VERSINIA ENTEROCOLITICA

- 1494 HILL (WE), PAYNE (WL) and AULISIO (CCG). Detection and enumeration of virulent *Versinia enterocolitica* in food by DNA colony hybridization. *Appl. Environ. Microbiol.* 46(3); 1983; 636-41

A portion of a 44-megadalton plasmid found in *Versinia enterocolitica* 8081 was used as a genetic probe to differentiate virulent and nonvirulent strains of the species. A DNA colony hybridization technique was employed. Three *Bam* HI restriction endonuclease fragments labeled with ^{32}P by nick translation were hybridized to lysed colonies of pure cultures, mixtures of virulent and nonvirulent cells, and portions of a food sample artificially contaminated with virulent *V. enterocolitica*. The results of the colony hybridization test for virulence were the same as those obtained by the autoagglutination and suckling mouse test. DNA colony hybridization detects pathogenic *V. enterocolitica* in foods without the need for enrichment or pure cultures. AA

FOOD ADDITIVES

- 1495 SOFOS (JN). Antimicrobial effects of sodium and other ions in foods: A review. *J. Food Safety.* 6(1); 1984; 45-78

Discusses: sodium compounds in food processing; antimicrobial effects of NaCl; contribution of NaCl to food stability and safety; nitrite and other food additives; acidity; microorganisms; substrates; storage temperature; NaCl concentration and extent of inhibition; heat treatment; other chloride salts; and a_w and soluble effects. BSN

- 1496 TOMPKIN (RB). Indirect antimicrobial effects in foods; Phosphates. *J. Food Safety.* 6(1); 1984; 13-27

Discusses: phosphates and antimicrobial effects on fruit juice, fish, meat, bacon, franks, pork slurries, perishable canned cured pork, poultry, bread and cheese; pasteurized cheese products; data on culture media. BSN

- 1497 McCORMICK (RD). Polyfunctional phosphates - ingredients essential to processed foods. Part I. *Process. Prep. Food* 152(2); 1983; 97-101

Discusses the role of phosphates as ingredients in processing of beverages, cereals, grain products and baked goods. BSN

- 1498 McCORMICK (RD). Polyfunctional phosphates ingredients essential to processed foods. Part 2. *Process. Prep. Food.* 152(3); 1983; 119-23

Discusses: applications to fruits and vegetables; gels and gums; phosphates in muscle foods; other properties useful to muscle foods; dairy and non-dairy products and future phosphate applications. BSN

- 1499 DEGRE (R) and SYLVESTRE (M). Effect of butylated hydroxyanisole on the cytoplasmic membrane of *Staphylococcus aureus* Wood 46. *J. Food Prot.* 46(3) 1983; 206-9

Within 15 minutes *Staphylococcus aureus* cells rapidly and completely adsorbed BHA. Exposure to 50 μg of BHA, proved bactericidal against *S. aureus*. Lethality was observed only over and above 100 $\mu\text{g}/\text{ml}$ and this activity was related to leakage and nucleotidies. Protoplasts resulting from lysostaphin treatment underwent lysis at levels as low as 25 $\mu\text{g}/\text{ml}$. Same amount of BHA was absorbed by a mutant resistant to 50 $\mu\text{g}/\text{ml}$ BHA, but protoplasts of this strain were less susceptible to lysis. BSN

- 1500 RICOMUNOZ (E) and DAVIDSON (PM). Effect of corn oil and casein on the antimicrobial activity of phenolic antioxidants. *J. Food Sci.* 48(4); 1983; 1284-8

Several inhibitory concentrations of butylated hydroxyanisole (BHA) and tertiary butylhydroquinone (TBHQ) were tested against five microorganisms in the presence of 0, 1.5, 3.0 and 4.5% (v/v) of a lipid, corn oil, or 0, 3, 6, and 9% (w/v) of a protein, casein. In all cases, casein depressed, but did not abolish, the antimicrobial activity of BHA. However, corn oil virtually eliminated the antimicrobial properties of lethal doses of BHA. In contrast, TBHQ was affected much less by the food components than BHA, retaining considerable antimicrobial activity in most cases except with *Staphylococcus aureus*. AA

- 1501 HERALD (PJ) and DAVIDSON (PM). Antibacterial activity of selected hydroxycinnamic acids. *J. Food Sci.* 48(4); 1983; 1378-9

- 1502 ANON. Radiation preservation of foods. *Food Technol. Aust.* 35(10); 1983; 456-60

- 1503 PRZYBYLA (A). Artificial flavours. Play key role in current food formulation work. *Process. Prep. Food.* 152(3); 1983; 109-12

Discusses recent advancements in the use of artificial flavours in processing of various food products. BSN

- 1504 WONG (H-C) and KOEHLER (PE). Production of red water-soluble *Monascus* pigments. *J. Food Sci.* 48(4); 1983; 1200-203

Water-soluble and thermal, as well as photo-stable, red *Monascus* pigments, were prepared by reacting the extracted pigment with aminoacetic acid and aminobenzoic acid. These modified pigments were compared to those using glutamic acid and gelation as the modifying agents, showing that the colours and stabilities of these modified pigments were similar. Red pigments extracted from the mycelia could be dissolved in ethanol, propylene glycol, or in gelatin solution and freeze-dried. These red pigment concentrates or freeze-dried pigments could also be used as food colourants. AA

- 1505 LISTER (CJ) and SMITHARD (RR). Effects of intraruminal administration of polyol to sheep. *J. Sci. Food Agric.* 35(1); 1984; 21-8

The polyhydric alcohols have elicited interest as sweeteners in foods for diabetes and as sugar substitutes for reducing dental caries. Inclusion of polyols in incubations of unadapted rumen fluid (of sheep) showed little effects on volatile fatty acids; with adaptation, however, the fermentation pattern was found to change towards a acetate:propionate ratio, Hexitols disappeared during fermentation but pentitols were more resistant, arabinotol was also fermented rapidly. In incubations with adapted microflora, xyli-tol was more resistant to fermentation than arabinotol. JVS

- 1506 RIVAS (HJ) and SHERMAN (P). Soy and meat proteins as food emulsion stabilizers. 1. Viscoelastic properties of corn oil-in-water emulsions incorporating soy or meat proteins. *J. Texture Stud.* 14(3); 1983; 251-65

The creep compliance-time response of 50% (wt/wt) corn oil-in-water emulsions has been studied at a constant stress of 47.8 dyne cm⁻² over the pH range 2.5-7.5. The emulsions were stabilised by acid precipitated (APS), 7S(7SPRF) or 11S(11SPRF) soy protein fractions, water soluble (WSMP) or salt soluble (SSMP) meat protein fractions. All the emulsions exhibited viscoelasticity. WSMP emulsions exhibited the highest initial viscoelasticity

parameter values and this was attributed to the strong interlinking of WSMF loops adsorbed on the surfaces of adjacent oil drops. The parameter values of all the emulsions increased during the first 5-7 days storage and then they decreased. At any selected pH, the 7SPRF emulsions exhibited the largest relative increase in parameter values. The changes in viscoelasticity during storage were explained on the basis of the relative effects of further protein loop interlinkage and drop coalescence. AA

- 1507 RIVAS (HJ) and SHERMAN (P). Soy and meat proteins as food emulsion stabilizers. 2. Influence of emulsification temperature, NaCl and methanol on the viscoelastic properties of corn oil-in-water emulsions incorporating acid precipitated soy protein. *J. Texture Stud.* 14(3); 1983; 267-75

The rheological properties of concentrated corn oil-in-water emulsions stabilised by acid precipitated soy protein have been studied as a function of emulsification temperature, methanol and salt concentration. Viscoelasticity parameters were derived from the creep compliance-time response of the emulsions at a constant stress of 47.8 dyne cm⁻². All the emulsions exhibited higher parameter values, both immediately after preparation and during storage, than comparable emulsions prepared at ambient temperature in the absence of methanol or NaCl. This was attributed to the increased unfolding of adsorbed protein molecules which permits greater interlinking, by hydrophobic bonds, of molecular segments projecting from the surfaces of adjacent oil drops. AA

CEREALS

- 1508 CARLSON (BL) and MILLER (DD). Effects of product formulation, processing, and meal composition on *in vitro* estimated iron availability from cereal-containing breakfast meals. *J. Food Sci.* 48(4); 1983; 1211-6

The effects of breakfast cereal composition, breakfast cereal processing, and breakfast meal composition on relative iron availability from breakfast meals were estimated using an *in vitro* method. Addition of wheat bran and germ to cereals and meals reduced iron availability. Presweetening caused a slight increase in iron availability. Comparisons among meals containing cereals that were similar except for type of processing showed that processing may affect iron availability. Addition of orange juice to breakfast meals caused a dramatic enhancement of iron availability. Ascorbic acid fortified apple and grape juice increased iron availability but the effect was small compared with the orange juice effect. Studies with purified organic acids showed that ascorbic and citric acids present in the juices caused the observed enhancement of iron availability. Citric acid was a more potent enhancer than ascorbic acid. AA

- 1509 WEINBERGER (G) and GOODWILL (RE). Development of *Tribolium castaneum* as a biological assay for the nutritive quality of lysine and/or protein in small grain cereals. *Nutr. Rep. Int.* 27(6); 1983; 1143-52

- 1510 CAHAGNIER (B), RICHARD-MOLARD (D) and POISSON (J). Evolution of the ergosterol content of cereal grains during storage. A possibility for a rapid test of fungal development in grains. *Sci. Aliment.* 3(2); 1983; 219-44 (French)

Grains of maize and paddy were subjected to hydrothermal treatment at temperatures ranging from 25 to 40 C, and relative humidities of 93,85,80,

and 72%. The dominant fungal species growing on such grains have been identified. The curves for mould count, ergosterol content, and fat acidity of the grains have been determined. The curves for maize showed higher values for all these parameters than the curves for rice. Good correlations were observed between mould counts, ergosterol content, and fat acidity at relative humidities above 80%. Physical treatments - such as hot air drying, gamma irradiation - or chemical treatment (say, with propionic acid) destroy a great part of the mycoflora, but affect the pre-existing ergosterol only to a slight extent. KMD

- 1511 MAYR (GE). Disinfestation of cereals with poisonous gases - Retrospect and preview. *Getreide Mehl Brot*. 37(4); 1983; 109-12

In West Germany, the damage caused by pests to cereals is estimated to reach the level of 300,000 million DM per year. Consequently, the advantages of using gases like hydrocyanic acid, ethylene oxide, phosphine, and methyl bromide for fumigation of cereals do not need to be emphasized. KMD

RICE

- 1512 MITSUDA (H), KAWAI (F), YAMAMOTO (A) and UENO (S). Capsule-packed freezing of cooked rice and glutinous rice cakes. *J. Food Sci.* 48(4); 1983; 1139-44

Cooked rice and commercial glutinous rice cakes were frozen by a capsule-packed freezing method developed and then stored. Characteristics of samples frozen by this new method were compared with those of samples frozen in deep freezers (-20 C and -50 C), or chilled in an ordinary (5 C) or Cold Fog refrigerator (OC). Texturometer measurements, glucoamylase digestion, and X-ray diffraction analysis of specimens thawed to room temperature indicated that the samples prepared by our new method were superior to those frozen in conventional freezers or chilled in refrigerators. Simulation experiments in a program freezer showed that rapid freezing and adequate tempering were characteristic of our capsule-packed method. AA

- 1513 JULIANO (BO) and PEREZ (CM). Major factors affecting cooked milled rice hardness and cooking time. *J. Texture Stud.* 14(3); 1983; 235-43

- 1514 BEAN (MM), ELLISTON-HOOPS (EA) and NISHITA (KD). Rice flour treatment for cake-baking applications. *Cereal Chem.* 60(6); 1983; 445-9

Rice flour in baked products gets enhanced functionally just before use when soaked in water. Eating quality, volume and appearance of layer cakes made from 100% rice flour shows improvement on hydration. During long hydration, reducing sugars develop and account for colour improvement. Superior quality cakes with textural characteristics were obtained from flours from U.S. short and medium-grain rice. BSN

- 1515 BHATTACHARYYA (AC) and BHATTACHARYYA (DK). Refining of high FFA rice bran oil by alcohol extraction and alkali neutralization. *J. Oil Technol. Assoc. India.* 15(2); 1983; 36-8

Rice bran oil, with a high FFA content, was first degummed and dewaxed by the "lipofrac" process, and then deacidified by a two-stage extraction with alcohol, at ambient temperature. The oil obtained had a low FFA content and was suitable for alkali refining, bleaching, and conversion to vanaspati. KMD

WHEAT

- 1516 TOGNAZZA (B). Impact mills and stabilization of milled products. *Getreide Mehl Brot*. 37(4); 1983; 107-9 (German)

Impaction of wheat prior to milling of the first grits greatly reduces the proportion of "filth" in the finished product. In this connection, the design of not only the impact mill, but also of the aspiration machine are of prime importance. The inclusion of a concentrator in the mill lay-out would facilitate the removal of perforated grains, and also reduce the quantity of grain to be passed through the impact mill. The speed of rotation plays an important role in the impaction of grits, fines, and flour. Thus impact mills provide the miller a means to clean up his products and produce hygienic foods with a good storage life. KMD

- 1517 ZWINGELBERG (H), MEYER (D) and GERSTENKORN (P). Influence of different kinds of smooth rolls on flour yield and flour quality. *Getreide Mehl Brot*. 37(4); 1983; 112-7 (German)

Smooth rolls with varying depths of roughness were used for the production of wheat grits and wheat fines. The effects of different rollers running at different velocities, and with varying differences in rotational speed on the following parameters have been reported: milling yield, ash content, energy consumption, particle size distribution, starch damage, water uptake, dough rheology, and baking quality of flour. It is concluded that smooth rolls should be made from comparatively less hard materials, so that they can wear out to the required degree of roughness; such materials have the additional advantages of being better conductors of heat. KMD

- 1518 DAVIDSON (VJ), PATON (D), DIOSADY (LL) and SPRATT (WA). Residence time distributions for wheat starch in a single screw extruder. *J. Food Sci.* 48(1983); 1157-61

Residence time distributions for wheat starch in a single screw extruder were measured for different operating conditions using a manganese dioxide tracer. Two flow models which differed in the definition of dead space were used to represent the flow pattern in the extruder. The parameters for each model were fitted using the experimental residence time distributions. Screw speed and the moisture level of the feed showed the strongest effects on the average residence time. A small fraction of the flow, 5-20%, was held up in the dead space region. The remainder passed directly through the active region with a residence time distribution close to plug flow. An apparent power law index for the starch melt was calculated and over the experimental range of extrusion conditions it varied from 0.2 to 1.0. AA

- 1519 OSBORNE (BG). Investigations into the use of near infrared reflectance spectroscopy for the quality assessment of wheat with respect to its potential for bread baking. *J. Sci. Food Agric.* 35(1); 1984; 106-10

The reflectance data obtained at 1100-2500 nm for U.K. wheats were correlated with protein content, alpha-amylase (falling number method) and protein quality (measured by SDS sedimentation volume). Only protein content was capable of satisfactory calibration against N.I.R. The study led to a conclusion that N.I.R. could not help in the measurement of bread baking quality of wheat (of U.K. at least), beyond the prediction from protein content. JVS

- 1520 SINGH (T), MANINDER (K) and BAINS (GS). Malting of *Triticum dicoccum* (Khapli) wheat: Response to gibberellic acid and use in baking. *J. Food Sci.* 48(4); 1983; 1135-8, 1144
- T. dicoccum* malt developed high amylolytic and proteolytic activity by applying 0.25 and 0.50 ppm gibberellic acid (GA) and germination for 5 and 7 days at 20 C. The 5- and 7-day malts without GA showed an alpha-amylase activity (SKB/g of 73.7 and 99.2, respectively, which was increased to 183.5 and 193.1 by 0.5 ppm of GA treatment. Kolbach Index values of 61.7 and 65.2% of GA malts indicated high modification with conversion times of <1 minute. Phytic P decreased from 80.5% in wheat to 41.2-53.4% in malts. Increased volume and softer crumb were characteristic of loaves made with 10 SKB of malt per 100 g flour without sugar in the formula. AA
- 1521 MacARTHUR (LA) and D'APPOLONIA (BL). Gamma radiation of wheat. I. Effects on dough and baking properties. *Cereal Chem.* 60(6); 1983; 456-60
- Amylograph peak viscosity and falling number values of cobalt 60 gamma-irradiated (50, 100, 200 and 300 Krad) wheat flour significantly decreased as radiation dosages increased, whereas grain amylase analyzer value remained almost constant. Farinograph absorption increased, dough development time and stability decreased with increase in radiation dosage. Baking quality decreased with increase in radiation, but appeared to be more influenced by variety. When irradiated flour was stored for six months, baking quality improved slightly. BSN
- 1522 MOREY (DD). Amino acid composition of six grains and winter wheat forage. *Cereal Chem.* 60(6); 1983; 461-4
- Amino acid profiles were determined on grain of five cultivars each of winter wheat (*Triticum aestivum* L.) and triticale (*Triticosecale*, Wittmack), on three cultivars of rye (*Secale cereale* L.), and on one each of barley (*Hordeum vulgare* L.), oats (*Avena sativa* L.), and soyabean (*Glycine max* (L.) Merr.) grown in Georgia during two seasons. Oat grain had the most desirable amino acid composition of all grains tested. Oats excelled in lysine, arginine, valine, leucine, isoleucine, and phenylalanine. Oats were equal to other cereal grains in threonine, methionine, and histidine. Barley did not exceed oats in any of the essential amino acids. Lysine content was lower in high-protein (16.5%) barley, whereas glutamic acid and proline were higher. Triticale and rye grains were higher in lysine than wheat grain. The new triticale cultivar Beagle 82 was higher in lysine, histidine, arginine, aspartic acid, threonine, serine, glycine, alanine, valine, methionine, leucine isoleucine, tryosine, and phenylalanine than other triticale cultivars tested. Wheat cultivars were lowest in lysine and low in threonine and valine content. Soyabeans were low in methionine and lower than oats in valine content. No seasonal differences were found in amino acid composition of wheat, triticale, and oat cultivars, although crude protein varied from season to season. AA
- 1523 NAYINI (NR) and MARKAKIS (P). Effect of milling extraction on the inositol phosphates of wheat flour and bread. *J. Food Sci.* 48(4); 1983; 1384, 1387
- SRW wheat was experimentally milled to 70%, 80%, 90% and 100% extraction flours, and "standard" bread was prepared from these flours. Six inositol phosphates and inorganic phosphate were found in all flours and breads. Inositol hexaphosphate, inorganic phosphate and total P increased with the degree of extraction. About 2/3 of the inositol hexaphosphate disappeared as a result of bread making, but an overall phosphate balance was possible only

after taking into account the intermediate inositol phosphates. Commercial white bread and whole wheat bread were also analyzed for the entire spectrum of phosphates. AA

- 1524 MORAD (MM) and RUBENTHALER (GL). Germination of soft white wheat and its effect on flour fractions, bread-baking, and crumb firmness. *Cereal Chem.* 60(6); 1983; 413-7

- 1525 BUSHUK (W), KHAN (K) and McMASTERS (GJ). Glutenine - the key to bread-making quality of wheat flour. *Getreide Mehl Brot.* 37(4); 1983; 99-101 (German)

The existence of a non-covalent bond between a new carbohydrate and the aggregating, protein sub-units of glutenine has been demonstrated. The combination of these components results in a higher molecular weight of the glutenine complex. Though it is quite certain that the carbohydrate is bound to the Fraction I of glutenine by a non-covalent linkage, it is not yet certain whether the carbohydrate is really needed for the aggregation of these sub-units. KMD

- 1526 BERGER (M). Soft wheat lipids. 2. composition of free and bound lipids in flour from eight varieties of French soft winter wheat. *Sci. Aliment.* 3(2); 1983; 181-217 (French)

Free and bound lipids were extracted from test flours of eight varieties of French soft winter wheat. The composition of their polar and non-polar lipids was determined. The results prove that the varieties with the same parent are closely similar, which confirms an active genetic factor in these relations. Interrelations between the technological value of the varieties tested and the content and composition of lipids could not be clearly demonstrated. The application of ultrametric classification techniques enabled - in the case of a comparison of the basic lipid components of free lipids - the varieties to be classified according to their technological properties. The same results were not obtained if the bound lipids were analyzed in the same way. AA

- 1527 SCOTT (PM), KANHERE (SR), LAU (P-Y), DEXTER (JE) and GREENHALGH (G). Effects of experimental flour milling and breadbaking on retention of deoxynivalenol (vomitoxin) in hard red spring wheat. *Cereal Chem.* 60(6); 1983; 421-4

By using GS, electron capture and MS single ion monitoring detection, deoxynivalenol (DON, vomitoxin) content of different fractions and flour from HRS Canadian wheat was determined; two methods of clean up gave comparable results. DON, distributed throughout the milled products, was not destroyed by processing into bread. DON was found in higher amounts in dockage (16.7 µg/g), followed by 4.6 µg/g in cleaned wheat and flour and bread (flour weight basis) 4.1 and 4.2 µg/g in two milling and baking experiments, respectively. BSN

- 1528 RAM (BP) and NIGAM (SN). Texturometer as a tool for studying varietal differences in wheat flour doughs and gluten proteins. *J. Texture Stud.* 14(3); 1983; 245-9

- 1529 PETERSON (CJ), JOHNSON (VA) and MATTERN (PJ). Evaluation of variation in mineral element concentrations in wheat flour and bran of different cultivars. *Cereal Chem.* 60(6); 1983; 450-55

By employing energy-dispersive X-ray spectrometry, amounts of Mg, P, S, Cl, K, Ca, Mn, Fe, Cu and Zn were determined in flour and bran samples obtained from replicated trials of 27 varieties of winter wheat. Variations in the mineral concentrations among genotypes were found to be stable and significant and may be almost as large as those caused by environmental factors. Flours recorded high positive genetic correlation with protein content. BSN

- 1530 HARGREAVES (PA) and MELKSHAM (KJ). A rapid high-pressure liquid chromatographic method for the determination of carbaryl residues in wheat grain. *Pestic. Sci.* 14(4); 1983; 347-53

In this method, a detection level of 0.1 mg/kg in a 50 g sample of wheat was achieved. Recoveries of 86% at the 1 mg/kg level and 90-99% at the 5 mg/kg level were obtained for fortified grain samples. KAR

- 1531 BENGSTON (M), DAVIES (RAH), DESMARCHELIER (JM), HENNING (R), MURRAY (W), SIMPSON (BW), SNELSON (JT), STICKA (R) and WALLBANK (BE). Organophosphorothioates and synergised synthetic pyrethroids as grain protectants on bulk wheat. *Pestic. Sci.* 14(4); 1983; 373-84

OAT

- 1532 TWEETEN (TN) and WETZEL (DL). Selective derivatization and high performance liquid chromatographic analysis of free fatty acids in lipid extracts. *Cereal Chem.* 60(6); 1983; 411-3

By using HPLC, individual free fatty acids (FFA) in lipid extracts were selectively derivatized under controlled conditions using p-bromophenacyl-bromide. The free fatty acid derivatives were then chromatographed on a reversed phase octysilane bonded-phase column with water and acetonitrile/tetrahydrofuran. FFA content of oat samples measured by this technique was 2.89-4.11% milligram of oleic acid per milligram of lipid extract. BSN

- 1533 WU (YV). Effect of germination on oats and oat protein. *Cereal Chem.* 60(6) 1983; 418-20

In germinated oats, lysine content increased after eight days, from 4.4-5.3 g/16g N. Sprouting was accompanied by increase in nonprotein nitrogen, albumin and residue nitrogen and decreases in globulin and prolamin. The percentage of nitrogen in oats germinated for three days or longer was more than that of the initial value of the grain due to loss of dry matter during germination. However, the absolute amount of nitrogen per kernel decreased. BSN

- 1534 ROBERT (LS), NOZZOLILLO (C) and ALTOSAAR (I). Molecular weight and charge heterogeneity of prolamins (avenins) from nine oat (*Avena sativa* L.) cultivars of different protein content and from developing seeds. *Cereal Chem.* 60(6); 1983; 438-42

MILLETS

PROSO MILLET

- 1535 LORENZ (K). Tannins and phytate content in proso millets (*Panicum miliaceum*). *Cereal Chem.* 60(6); 1983; 424-6

Phytate and tannin contents of proso millet (*Panicum miliaceum*) ranged from 0.17 to 0.47% and 0.055 to 0.178% catechin equivalents respectively. Dark coloured seeds showed higher amount of tannin than light coloured seeds. Significant reduction of phytate and tannin contents was observed on dehulling of seed. BSN

SORGHUM

- 1536 TAYLOR (JRN) and SCHUSSLER (L). Sorghum cultivar verification by electrophoresis. *J. Sci. Food Agric.* 35(1); 1984; 1-8

A procedure has been developed for sorghum cultivar verification by using urea-polyacrylamide gel electrophoresis. In the case of high tannin (bird resistant) sorghums the tannin layer surrounding the endosperm binds the protein and effects its electrophoretic pattern. This problem has been overcome by extracting the proteins with polyvinyl polypyrrolidone. The electrophoretic pattern of prolamins of sorghum was unaffected by the environment; or the length of storage of the grain. The cultivars appeared to retain the uniqueness of the prolamins through generations. JVS

- 1537 BENGSTRON (M), COOPER (LM), DAVIES (RAH), DESMARCHELIER (JM), HART (RH) and PHILLIPS (MP). Grain protectants for the control of malathion-resistant insects in stored sorghum. *Pestic. Sci.* 14(4); 1983; 385-98

Experiment conducted over 6 months period with stored sorghum indicated that fenitrothion + bioresmethrin and pirimiphos - methyl + carbaryl controlled typical malathion resistant strains of *Sitophilus oryzae*, *Rhyzopertha dominica*, *Tribolium castaneum* and *Ephestia cautella* KAR

MAIZE

- 1538 PEPLINSKI (AJ), ECKHOFF (SR), WARNER (K) and ANDERSON (RA). Physical testing and dry milling of high-moisture corn preserved with ammonia while drying with ambient air. *Cereal Chem.* 60(6); 1983; 442-5

A 14% increase in nitrogen with very little change in major components of high moisture corn subjected to intermittent application of anhydrous ammonia gas, and unheated air with intermittent application of anhydrous ammonia gas and stirring and subjected to storage for 8 months. Number of kernels with stress cracks increased due to stirring of corn. As a result of dry milling, 60% low-fat prime products from laboratory control lots and 59% and 61% from two ammonia treated grains and 59% from yield-dried (untreated) control respectively were obtained. All grits were found to have satisfactory flavours. BSN

- 1539 FERIA-MORALES (AM) and PANGBORN (RM). Sensory attributes of corn tortilla with substitutions of potato, rice, and pinto beans. *J. Food Sci.* 48(4); 1983; 1124-30, 1134

Corn tortillas were prepared with substitutions of 12, 24, and 36% of two varieties of potato, 10, 20, and 30% of rice, and 5, 10, and 15% of pinto beans. Trained judges developed descriptors for appearance, aroma, manual and oral texture, flavour, and after effects, to quantify differences from the all-corn reference. Up to 24% of either variety of potato, 30% of rice, and 15% beans could be substituted before undesirable sensory differences were detected. Potato improved texture, producing a softer, more flexible tortilla. Beans produced a less yellow, harder tortilla, and rice caused few sensory changes. Sensory texture compared well with Instron hardness and elongation measurements. Protein and lysine were unchanged by potato, increased by bean, and slightly decreased by rice substitution. AA

- 1540 PLAHAR (WE), LEUNG (HK) and COON (CN). Effects of dehydration and soy fortification on physicochemical, nutritional and sensory properties of Ghanaian fermented maize meal. *J. Food Sci.* 48(4); 1983; 1255-9

Fermented maize meal was air dried at 60 C and fortified with defatted soy flour at 0%, 10% and 20% replacement levels on dry basis. The effects on protein quality were determined by chick growth response studies and amino acids analysis, while sensory characteristics were evaluated by triangle and preference tests. Air drying did not affect chick growth response but slightly reduced preference of the meal. The drying caused only 6% and 16% losses in total and available lysine contents, respectively. Soy fortification of air-dried maize meal at 10% improved sensory preference to the same degree as freshly fermented meals and increased the protein quality significantly over both freeze-dried unfortified control and air-dried unfortified meals. Twenty percent soy fortified maize meal had low sensory score although the nutritive value was substantially increased. AA

BARLEY

- 1541 EL-NEGOUMY (AM), NEWMAN (CW) and MOSS (BR). Composition of acid- and alkali-extracted barley proteins as revealed by isoelectric focussing. *Cereal Chem.* 60(6); 1983; 429-32

PULSES

- 1542 REDDY (BN) and NUSRATH (M). Aflatoxin contamination in pulses from tribal areas of Medak district, Andhra Pradesh. *Curr. Sci.* 52(21); 1984; 1024
- 30 and 26 samples each of cowpea (*Vigna sinensis* Endl.) and horse gram (*Dolichos biflorus* L.) were collected from several villages of Medak District (India) and tested for aflatoxin contamination by observation under long wave UV light (360 nm) for bright greenish-yellow (BGY) fluorescence test. Samples positive to BGY fluorescence test were extracted for aflatoxins which were qualitatively and quantitatively estimated. Cowpea (21 samples) and horsegram (14 samples) respectively gave BGY fluorescence test. Out of them 15 samples of cowpea and 8 of horse gram were positive to one or more of the aflatoxin as tested by TLC. The highest concentration of toxin (aflatoxin B₁) was detected in cowpea (135 ppb) and the lowest (aflatoxin G₁) in horsegram (8 ppb). MVG

COWPEA

- 1543 ONIGBINDE (AO) and AKINYELE (IO). Oligosaccharide content of 20 varieties of cowpeas in Nigeria. *J. Food Sci.* 48(4); 1983; 1250-51, 1254
- Mature dry seeds of 20 varieties of cowpeas (*Vigna unguiculata*) grown in Nigeria were analyzed for their sucrose, raffinose and stachyose content. The dry seeds were ground into powder, extracted with 80% ethanol and the extract analyzed by paper chromatography using a mixture of n-butanol, ethanol, water and ammonia solution 8:1:2:1 (v/v). The results show a progressive decrease in raffinose and stachyose content with dehulling and cooking and an increase in sucrose level after cooking. The average content of the sugars in whole beans on dry weight basis was sucrose 0.8%, raffinose 2.6% and stachyose 3.3%. The average content for dehulled raw beans were sucrose 0.7%, raffinose 1.8% and stachyose 2.4% while in cooked beans it was 1.6%, 1.3%, and 1.8%, respectively. AA

- 1544 IMUNGI (JK) and POTTER (NN). Nutrient contents of raw and cooked cowpea leaves. *J. Food Sci.* 48(4); 1983; 1252-4
- Seeds of cowpea (*Vigna unguiculata*) cultivar MM₄ obtained from Kenya were grown for their leaves as a vegetable. The mean crude protein content of the leaves from the 1981 and 1982 seasons were 32.8 and 34.3% of total solids, respectively, and leaves were a particularly good source of mineral including iron, calcium, phosphorus and zinc. Levels of vitamin C, total carotene, and free and total folacin were 410 mg, 57 mg, 334 mcg and 2012 mcg, respectively, per 100 g of solids. Freshly harvested leaves cooked by a traditional Kenyan technique retained 88% of their crude protein and substantial quantities of minerals. Losses in vitamin C and free and total folacin were 87%, 49% and 66% while their recoveries in the cooking water were 5.6%, 20% and 12%, respectively. Carotene in the cooked leaf solids increased slightly. Comparisons with other leafy vegetables indicate good potential for processing. AA

FIELD BEAN

- 1545 SARASWATHI (G) and SHURPALEKAR (KS). Studies on carbohydrate fractions isolated from field bean (*Dolichos lab lab*) and ragi (*Eleusine coracana*): faecal excretion and effect on protein and calcium excretion. *Nutr. Rep. Int.* 28(1); 1983; 59-66

Pattern of faecal excretion of carbohydrate fractions isolated from field bean and ragi and their effect on excretion of protein and calcium was studied in rats. Faecal excretion of isolated fractions of field bean and ragi showed a similar pattern. Percentage excretion of the fractions was in the following increasing order: starch, pectin, hemicellulose and cellulose. High excretion of faecal nitrogen was observed on diets containing whole field bean and its hemicellulose, cellulose, starch fractions and whole ragi. Excretion of calcium was increased only by whole field bean.

HARICOT BEAN

- 1546 ZABIK (ME), UEBERSAX (MA), LEE (JP), AGUILERA (JM) and LUSAS (EW). Characteristics and utilization of dry roasted air-classified navy bean protein fraction. *J. Am. Oil Chem. Soc.* 60(7); 1983; 1303-8

- 1547 POWERS (JR) and CULBERTSON (JD). Interaction of a purified bean (*Phaseolus vulgaris*) glycoprotein with an insect amylase. *Cereal Chem.* 60(6); 1983; 427-9
- 1548 VAN BUREN (JP). Two effects of sodium chloride causing softening of the texture of canned snap beans. *J. Food Sci.* 48(4); 1983; 1362-3
- The effect of NaCl on the texture of canned snap beans was studied with leached and nonleached pods. Pectin and Ca solubilization were also measured. NaCl promoted softening both during cooking and apart from cooking. The cooking effect was accompanied by increased pectin solubility. The noncooking effect was accompanied by increased Ca solubility. AA

OILSEEDS AND NUTS

- 1549 PRINCEN (LH) and ROTHFUS (JA). Development of new crops for industrial raw materials. *J. Am. Oil Chem. Soc.* 61(2); 1984; 281-9
- Discusses: long chain fatty acids; Crambe (*Crambe abyssinica*); Limnanthes (*Limnanthes* Sp.); Lunaria (*Lunaria annua*); high erucic; low-glucosinolate rapeseed; short- to medium-chain fatty acids; hydroxy fatty acids; epoxy fatty acids; and wax esters. BSN

COTTONSEED

- 1550 CHOI (YR), LUSAS (EW) and RHEE (KC). Molecular structure and functionalities of protein isolates prepared from defatted cottonseed flour succinylated at various levels. *J. Food Sci.* 48(4); 1983; 1275-8
- Protein isolates were prepared from glandless cottonseed flour succinylated at various levels. Succinylation levels of the resultant proteins followed first order kinetics with respect to succinic anhydride concentration added. Succinylation decreased the amount of free sulphhydryl, as well as ϵ -amino groups of proteins, but did not change intermolecular disphide bonds. Protein isolate prepared from highly succinylated flour consisted of one homogeneous protein agglomerate, while isolate from unmodified flour contained several heterogeneous proteins. Water solubility of the isolates increased logarithmically with respect to degree of succinylation, with the sharpest increase at 95% succinylation or higher. Heat coagulability had an inverse-linear relationship with amounts of negative charges on protein molecules. Emulsion capacity and oil absorption capacity were not significantly changed at less than 60% succinylation. However, these increased markedly at greater than 60% succinylation. Emulsion capacity had a positive, but not linear correlation with water solubility of proteins. AA

RAPESEED

- 1551 BLAIR (R) and REICHERT (RD). Carbohydrate and phenolic constituents in a comprehensive range of rapeseed and canola fractions: Nutritional significance for animals. *J. Sci. Food Agric.* 35(1); 1984; 29-35
- Sinapine was estimated in cotyledons of rape and canola seeds at levels of 2.67 and 2.85% respectively. Tannins were present in small amounts in cotyledons. Alpha-amylase inhibition values were also low or negative-starch was negligible and available carbohydrate content 13-14%. The predicted

metabolisable energy value of commercial rapeseed or canola meal was near to the determined value when the available carbohydrates value was reduced to 35% of observed value. JVS

SESAME

- 1552 RIVERO DE PADUA (M). Some functional and utilization characteristics of sesame flour and proteins. *J. Food Sci.* 48(4); 1983; 1145-7
- Sesame defatted flour was prepared from dehulled seeds and the proteins extracted by isoelectric precipitation from an alkaline suspension of the flour. Temperature and pH effects on viscosity of a protein dispersion were measured using a Brookfield viscometer. Emulsifying capacity and emulsion stability were measured in mayonnaise and meat-type emulsions, respectively. Sesame flour was texturized by a simple method to produce a ground meat-like product with a hydration capacity of 380-440%. Sensory evaluation of meat loaves with 0-40% meat replaced by hydrated textured defatted sesame flour indicated no significant difference between samples. Viscosity of sesame protein dispersions at 90 C increased with increasing pH. The proteins did not form a self-supporting gel. Their emulsifying capacity proved to be relatively high when compared with traditional proteins. AA

SOYABEAN

- 1553 HSU (KH). Effect of temperature on water diffusion in soyabean. *J. Food Sci.* 48(4); 1983; 1364-5
- Influence of temperature on the concentration-dependent diffusivity of water into soyabean was investigated. At a constant water content, Arrhenius relation existed between the water diffusivity and temperature. The activation energy for diffusion was found to be between 9 and 13 Kcal/mole. The activation energy also was found to vary linearly with the water content. AA
- 1554 WANG (LC) and WOLF (WJ). Soyabean protein aggregation by sonication: Ultracentrifugal analysis. *J. Food Sci.* 48(4); 1983; 1260-64
- Ultracentrifugal analysis was used to study aggregation of 7S globulin induced by ultrasonic treatment of water extracts from defatted soyabean flake. In pH 7.6, 0.5 ionic strength buffer, aggregated 7S proteins sedimented as 4 species and represented 25-40% of the total proteins. Aggregates also existed at low ionic strength, but dialysis at 0.5 ionic strength caused additional aggregation of sonically modified 7S proteins. After exposure to 0.5 ionic strength, aggregates were stable to subsequent changes in ionic strength with one exception; some reversal of aggregation occurred when samples were dialyzed against water. Aggregates exhibited highest stability at pH 6.5-6.8 and were stable at room temperature for 9 hours or more. Sonic-induced aggregation of 7S proteins resembles the phenomenon observed on heating water extracts at 80 C. AA
- 1555 HAFEZ (YS) and MOHAMED (AI). Biochemical study on the non-protein trypsin and chymotrypsin inhibitors in the soyabean. *J. Food Sci.* 48(4); 1983; 1265-8, 1283
- The chemical properties of nonprotein trypsin inhibitor (NPTI) and non-protein chymotrypsin inhibitor (NPCTI) in the soyabean were studied. NPTI was extracted with 50% methanol and treated with TCA to a final concentration

of 16% (W/V). Two dimensional thin-layer chromatography was used to make a peptide map of the methanol extract; 14 spots were observed. To distinguish the active peptides, the sample was mixed with trypsin or chymotrypsin; some peptides disappeared which formed complexes with the enzyme. The relative rate of inhibition indicated that inhibition was stoichiometric for trypsin and chymotrypsin. Dissociation constants of complexes (enzyme and inhibitor) showed that inhibition of chymotrypsin and trypsin were competitive and uncompetitive, respectively. AA

- 1556 CONKERTON (EJ), PARRISH (FW), CHAPITAL (DC) and ORY (RL). Isolation of a stachyose-sucrose complex from soyabeans and peanuts. *J. Food Sci.* 48(4); 1983; 1269-71

A major component of the free carbohydrate pool from defatted soybean and peanut flours, initially resolved but not identifiable by HPLC, was isolated using coconut charcoal chromatography. Spectrophotometric and chromatographic analyses of the isolated component indicated the presence of glucose, fructose and galactose. After standing at 27 C for several weeks, the syrupy material transformed into a mixture of stachyose and sucrose. Their identities were confirmed by melting point, optical rotation, chromatography, and ^{13}C NMR. It is proposed that the initial compound was a stachyose-sucrose complex. AA

- 1557 CLYDESDALE (FM) and CAMIRE (AL). Effect of pH and heat on the binding of iron, calcium, magnesium, and zinc and the loss of phytic acid in soy flour. *J. Food Sci.* 48(4); 1983; 1272-4, 1283

The effect of pH and heat treatments on the binding of iron, calcium, magnesium and zinc and the loss of phytic acid in defatted soy flour was investigated. The soy flour was found to bind more iron, calcium, and magnesium at pH 6.8 than at pH 5.0, but the reverse situation occurred with zinc. Boiling caused a significant increase in binding of zinc and magnesium at both pH values, but was pH dependent for iron and calcium. Toasting caused a significant increase in binding of zinc and calcium at both pH values and a pH variable effect on iron and magnesium. Phytic acid analysis under the same conditions suggested that the degree of binding of these minerals did not correlate with the presence of phytic acid. AA

SUNFLOWER SEED

- 1558 YOUSUF ALI KHAN (R), AZEEMODDIN (G), ATCHYUTA RAMAYYA (D) and THIRUMALA RAO (SD). Optimum conditions of processing sunflower seeds. *J. Oil Technol. Assoc. India.* 15(2); 1983; 33-5

Sunflower seed was first cleaned and graded, then dehulled in a disc huller, and finally crushed in single chamber and double-chamber expellers. Maximum oil yield is obtained by crushing rolled seed in the reverse worm-setting. Seed crushed at a low temperature gave an oilcake of lighter colour; while seed crushed in the double chamber gave an oilcake of lower oil content. Sunflower seeds are best stored in gunny bags, rather than in a bin, or in a heap. Sunflower seed grits deteriorate rapidly during storage. Snacks (Bhajji, Chapathi) made with sunflower oilcake as an ingredient had a greenish tinge, probably due to the presence of chlorogenic acid in the sunflower seed kernel. KMD

- 1559 HOLM (ET) and BREEDON (CH). Comparison of the whippability of defatted meal from three hybrid varieties of sunflower seed. *J. Food Sci.* 48(4); 1983; 1131-4

The whippability of meals from three hybrid varieties of sunflower was examined under varying conditions of temperature, meal concentration, pH and whipping time. Whippability was measured in terms of initial foam volume produced and the stability of the foam after periods of 30 and 120 minutes. Optimal levels of maximum volume and stability under the varying conditions were determined by response surface analysis. Optimal levels were not the same for all hybrids tested. The nitrogen solubility index of the meal from each hybrid correlated strongly with initial foam volume but not with foam stability. AA

COCONUT

- 1560 SINGH (KP), PANDEY (SY), KHAN (MM) and SINGH (S). Residues of aldicarb in coconut. *Pestic. Sci.* 14(4); 1983; 441-3

Aldicarb is applied to control root rot in coconut. Residues in samples of kernel did not exceed 0.04 mg/kg (total toxic aldicarb residues), while milk samples showed no detectable levels of aldicarb. KAR

GROUNDNUT

- 1561 IRHO. Analytic bibliography of groundnut seed. *Oleagineux.* 38(2); 1983; 145-60

Abstracts of 151 recent papers pertaining to groundnut seed have been grouped as follows: 1) General - Incidence of quality on yield - Seed production. (2) Germination - Physiology - Factors affecting viability. (3) Diseases and Parasites. (4) Plant Protection Treatments. (5) Conditioning - Harvesting - Drying - Beating - Dehusking. (6) Storage and (7) Quality Control. KMD

- 1562 BOCKELEEE-MORVAN (A). Different varieties of groundnut: Geographical and climatic distribution, availability. (including technical sheets on the varieties that are being popularized). *Oleagineux.* 38(2); 1983; 76-116

The varietal characteristics of 19 new groundnut varieties that are being popularized in West Africa have been listed in a table. A brief note on their geographical and climatic distribution, and availability is followed by technical data sheets - one for each variety - which give information on their origin, botanical classification, vegetative cycle, description, 100-pod weight, 100-grain weight, yield after dehusking, oil content, dormancy, pod/straw ratio, optimal density of the seeds, weight of seeds per hectare, resistance to drought, resistance to disease, and contents of oleic and linoleic acids. Each data sheet is in 3 languages (French, English and Spanish). KMD

- 1563 ANON. Groundnut seed - Special number. *Oleagineux.* 38(2); 1983; 60-160

This special number contains the following items: De PINS (O) - Cultivar improvement of groundnut and production of selected seed (p. 61-71); BOCKELEEE-MORVAN (A) - Different varieties of groundnut: Geographical and climatic distribution, availability (including technical sheets on the varieties that are being popularized) (p. 73-116); GILLIER (P) - Gene pool and

basic seed (p. 117-8); DELBOSC (G) - Certified seed. System of multiplication and control (p. 119-29); THOMAS (P) - Conditioning and conservation of groundnut seed (p. 131-9); PICASSO (C) - Quality control of seed (p. 141-4); and Documentation Service - Analytic bibliography of groundnut seed of IRHO (p. 145-60). KMD

PIZZA NUT

- 1564 UNKLESBAY (K), UNKLESBAY (N), KELLER (J) and GRANDCOLAS (J). Computerized image analysis of surface browning of pizza shells. *J. Food Sci.* 48(4); 1983; 1119-23

TUBERS AND VEGETABLES

- 1565 SCHWARTZ (SJ) and VON ELBE (JH). Kinetics of chlorophyll degradation to pyropheophytin in vegetables. *J. Food Sci.* 48(4); 1983; 1303-6

POTATO

- 1566 TALLEY (EA), TOMA (RB) and ORR (PH). Composition of raw and cooked potato peel and flesh: Amino acid content. *J. Food Sci.* 48(4); 1983; 1360-61

The nitrogen and total amino acid contents of Katahdin and Pontiac varieties of potatoes are reported for the peel and flesh, before and after cooking. With the exception of glutamic acid and γ -aminobutyric acid, all of the contents were higher in the peel. Losses of nitrogen and amino acids were minor in boiling whole potatoes but greater in oven baking in the peel or in boiling the peeled potato. Microwave cooking losses were less than in oven baking. AA

- 1567 FAIRWEATHER-TAIT (SJ). Studies on the availability of iron in potatoes. *Br. J. Nutr.* 50(1); 1983; 15-23

Dried potatoes were incubated in gastric juice *in vitro* and the amount of Fe solubilized was compared with other foods. The rats absorbed 15.2 (2.7)% Fe from the diet containing 660 g dried potato/kg and 32.1 (2.8)% Fe from the semi synthetic diet containing FeSO_4 . There was a correlation between Fe solubilisation and ascorbic acid content of potatoes. KAR

- 1568 MARESCHI (JP), BELLLOT (JP), FOURLON (C) and GEY (KF). Loss of vitamin C in Bintje potatoes by regular storage and conventional cooking procedures. *Int. J. Vit. Nutr. Res.* 53(4); 1983; 402-11 (French)

A specific method (7), was employed for measurement of loss of ascorbic acid in the Bintje species of potatoes (grown in Pas-de-Calais) due to storage and different cooking procedures. Storage for 3 months in the dark at +12 C decreases the ascorbic acid level by about 50% while storage for 6-8 months, it becomes about 66%. Cooking of peeled potatoes (in water, vapour or as French fries) causes an additional loss of vitamin C of roughly 40-45%, whereas unpeeled potatoes lose only about 7% by cooking. When cooked potatoes are kept warm, on a hot plate, for an hour, the loss of ascorbic acid amounts up to 70%. AA

- 1569 HAYASHI (T) and KAWASHIMA (K). Activities of enzymes of sugar metabolism in gamma-irradiated potato tubers. *J. Food Sci.* 48(4), 1983; 1242-5, 1249

The sucrose content of potato tubers was increased by gamma-irradiation. The activities of enzymes responsible for sugar metabolism in irradiated potato tubers were measured during storage after irradiation. The activities of phosphorylase, sucrose synthase and sucrose phosphate synthase were significantly enhanced by irradiation and remained at a high level while sucrose was accumulated in irradiated tubers. The activities of phosphoglucose isomerase and phosphoglucose isomerase were little influenced by irradiation. The activity of UDP-glucose pyrophosphorylase was enhanced slightly by irradiation and decreased to a level lower than unirradiated tubers depending upon irradiation dose. AA

- 1570 THOMAS (). Radiation preservation of foods of plant origin. Part 1. Potatoes and other tuber crops. *CRC Crit. Rev. Food Sci. Nutr.* 19(4), 1984; 327-79

Discusses: potato (in human nutrition and agricultural economy, causes of postharvest losses: methods of storage and preservation); sprout inhibition by irradiation (effect of dose rate, influence of variety and storage temperature, influence of time and irradiation); biochemical mechanisms of sprout inhibition (hormonal control of dormancy, irradiation effect on hormone metabolism, auxin metabolism, effect on endogenous auxin and inhibitor β -levels and effect on nucleic acid and protein synthesis); metabolic changes in irradiated potatoes (respiration, carbohydrate metabolism, enzymes of carbohydrate metabolism, protein and amino acid metabolism, ascorbic acid and other vitamins, effect on greening and glycoalkaloid) incidence of storage rots in irradiated potatoes (effect of irradiation on wound healing, effect on phytoalexins, effect on phenolics metabolism, enzymes of phenolic metabolism, combination treatments for reducing microbial spoilage, tuber moth and nematode control); identification of irradiated potatoes; irradiation induced discolouration in potatoes; industrial processing and storage tests; test marketing and consumer acceptance studies; commercial potato irradiation; wholesomeness of irradiated potatoes; yams; other tuber crops; and future of irradiation of tuber crops. BSN

SWEET POTATO

- 1571 RAVICHANDRAN (V) and SULLIA (SB). Pathogenic fungi from sweet potato. *Curr. Sci.* 52(21), 1983; 1031

During a two year survey of fruits and vegetables in the markets of Mangalore city, (India), several pathogenic fungi were isolated. Some of the hitherto unrecorded pathogens of sweet potato (*Ipomoea batatas* (L.) Lamk.) were *Rhizoctonia solani* Kuhn, *Penicillium digitatum* Sacc., *Myrothecium roridum* Tode ex Fr., *Arthrrium phaeospermum* Corda and Ellis and *Stemphylium botryosum* Wallr. The pathogenicity of each of the above fungi has been described. MVG

CASSAVA

- 1572 STEVENSON (MJ). The nutritional value of cassava root meal in laying hen diets. *J. Sci. Food Agric.* 35(1), 1984; 36-40

Diets (consisting of a control and 5 others with 100 to 500 g/kg⁻¹ diet)

were fed *ad libitum* to hens as mash or pellets for 28 day periods. The apparent metabolisable energy (AME) of diets was estimated by total collection method. Egg production and water uptake were not affected by high levels of cassava root meal. With increasing cassava root meal levels, the birds fed meal showed reduced food consumption. Birds reviewing pellets consumed more water than those on mash. The AME of cassava root meal was 14.1 MJ kg⁻¹ dry matter. JVS

TOMATO

- 1573 SINGH (BK), RAY (PK) and MISHRA (KA). Biochemical composition of tomato in relation to maturity on the vine. *Indian Food Packer*. 37(3); 1983; 72-6
Twelve varieties of tomatoes (Pusa ruby, Marglobe, Roma Red Plum, Best of All, Big Boy, Sabour Prabha, Sweet '72, Sioux, Punjab Keshari, Ponderosa, and S-120) were evaluated based on (i) total quantity of juice, (ii) soluble solids, (iii) acidity, (iv) reducing sugars and (v) ascorbic acid content. All varieties showed significant variations in all the constituents. With increase in the degree of ripeness, the values for (iii) and (v) decreased, whereas values for (i), (ii) and (iv) showed an increase in all the varieties. At soft ripe stage, (i) and (ii) were highest in Big Boy, while Red Plum gave the lowest yield (48.15%). Sabour Prabha showed highest acidity (2.01%) at firm ripe stage and at soft ripe stage (1.92%). BSN
- 1574 OKITANI (A), KIM (S-Y), HAYASE (F), CHUNG (T-Y) and KATO (H). Heat-induced changes in free amino acids on manufacturing heated pulps, purees and pastes from tomatoes. *J. Food Sci.* 48(4); 1983; 1366-7
The effect of heating on the free amino acid composition of processed tomato products, heated pulps, purees and pastes were examined. The major components of the fresh pulp were glutamic acid, γ -aminobutyric acid, aspartic acid, glutamine and asparagine. The heating process caused about a 40% loss of the total amino acids, which was attributable mostly to decreases in glutamic acid, glutamine and aspartic acid. Neither aromatic amino acids nor basic amino acids decreased in this process. Additional low temperature heating applied to the heated pulp to manufacture purees and pastes caused less effects than the high temperature heating used to prepare the pulp. AA

FRUITS

- 1575 ANON. Japan - access to the tropical fruit market. *Profodcil Bull.* 17(4); 1983; 11-31
Tropical fruits like mango, papaya, avocado, Kiwi fruit and papaya available for export and the market conditions in Japan for these fruits are surveyed. MVG
- 1576 ZOHRM (H) and LANGENBEIN (Th). Iron and tin content in canned fruit preserves (Random samples from the trade). *Gordian*. 83(9); 1983; 182-3 (German)
Commercial samples that had been stored at room temperature for 1 year were selected at random and analyzed for iron and tin content. Canned fruit preserves did not have more iron or tin than vegetable preserves; hence, there appears to be no pH-effect. The stored products did take up some metal (upto 19.7 mg Sn and 4.8 mg Fe per 100 g of fruit) but these quantities must be regarded as quite harmless. However, internal lacquering of the cans is necessary. KMD

STRAWBERRY

- 1577 SKREDE (G). Changes in sucrose, fructose and glucose content of frozen strawberries with thawing. *J. Food Sci.* 48(4); 1983; 1094-6, 1100

Free sugar composition of strawberries during thawing and up to 5 hours after-thaw storage was studied. Sucrose content of drained fruits and juice decreased by 70% whereas fructose and glucose content increased during thawing at 4 C. Total free sugar content remained constant. Sucrose degradation caused by invertase activity in the strawberry fruit rather than by sucrose synthase activity or acid hydrolysis was demonstrated. The sucrose inversion was more pronounced in drained fruits than in juice. Sucrose inversion also occurred when fruit was thawed by a current of air, microwave heating, or 35 C water, but to a lesser extent. The 5 hours holding period after thawing resulted in comparable sugar composition with all thawing procedures. For best preservation of the free sugar composition a fast thawing method should be chosen. AA

BANANA

- 1578 TERRA (NN), GARCIA (E) and LAJOLO (FM). Starch-sugar transformation during banana ripening the behaviour of UDP-glucose pyrophosphorylase, sucrose synthetase and invertase. *J. Food Sci.* 48(4); 1983; 1097-100

Starch concentration, sequence of appearance of sucrose, glucose and fructose and activity of some enzymes of sucrose synthesis were followed during ripening of preclimacteric bananas (*Musa acuminata*). As starch was degraded sucrose content increased and preceded formation of glucose and fructose. At the same time, while UDP-glucose pyrophosphorylase activity remained constant, activity of sucrose synthetase and invertase increased. The observed sugar and enzyme changes indicated that starch to sucrose transformation via glucose-1-phosphate-UDP-glucose may be an important mechanism for starch disappearance during ripening. The hypothesis was confirmed with thin banana slices infiltrated with ($^{14}\text{C}(\text{U})$) glucose-1-phosphate: the label was incorporated into sucrose three times faster for climacteric than for preclimacteric fruits. Pyrophosphorylase activity and climacteric induced activation of sucrose synthetase could be inhibited by protein and nucleic acids synthesis inhibitors. AA

GRAPEFRUIT

- 1579 PEREZ (LM), LOZADA (R) and CORI (O). Biosynthesis of allylic isoprenoid pyrophosphates by an enzyme preparation from the flavedo of *Citrus paradisi*. *Phytochemistry*. 22(2); 1983; 431-3

A cell-free system obtained from *Citrus paradisi* flavedo transformed mevalonic acid into mono- and sesquiterpenoids of ϵ - and 2-conformation. The enzyme system required bivalent metal ions and the presence of sulphydryl groups. IPP isomerase activity (EC 5.3.3.2) was independent of metal ions and almost insensitive to sulphydryl group reagents, while prenyltransferase (EC 2.5.1.1) was inactivated by DTNB and required bivalent metals for activity. The nature of the metal ion defined the stereochemistry of the products formed by prenyltransferase. The ratio of E-Z farnesylpyrophosphates was 3:1. This *citrus* species could, therefore, be a good starting material for the study of the stereochemistry of the enzymes forming E and Z sesquiterpenoids. AA

ORANGE

- 1580 VORA (JD), MATTHEWS (RF), CRANDALL (PG) and COOK (R). Preparation and chemical composition of orange oil concentrates. *J. Food Sci.* 48(4); 1983; 1197-9

Flavour and colour concentrates were prepared by a vacuum distillation process from cold pressed Valencia and midseason orange oils and were analyzed quantitatively by gas chromatography. Twenty-five major and minor constituents were identified by mass spectrometry. The influence of the concentration process on oxygenated flavour compounds, primarily aldehydes and alcohols, was evaluated. Aldehydes and colour values were determined by chemical and spectrophotometric methods. When compared with midseason orange oils, 25-35% higher concentration of oxygenated flavour compounds and of total aldehydes were found in Valencia orange oils. Midseason oils had 20-30% higher colour values when compared with Valencia oils. Cold pressed oils concentrated to 25-fold had an increase in colour value of 20-fold, while the concentration of oxygenated flavour compounds increased about 10 times. AA

KINNOW

- 1581 SANDHU (SS), DHILLON (BS).and SOHAN SINGH. Post-harvest application of gibberellic acid and wrappers on the storage behaviour of kinnow. *Indian Food Packer.* 37(3); 1983; 65-71

Kinnow fruits were treated with gibberellic acid (GA) of 10, 20, and 30 p.p.m. concentration, wrapped in sugarcane trash or paddy straw or perforated polyethylene sheet and stored at 17-22 C, 60-65% RH (Exp.I) or at 16-17 C, 70-80% RH (Exp.II). In Exp.I, minimum weight loss + spoilage of kinnow fruits was observed with polyethylene wrapper + 20 p.p.m. GA. However, sugarcane trash + GA 30 p.p.m. combination maintained maximum level of soluble solids and titratable acidity. Highest level of reducing sugars was maintained under sugarcane trash, whereas the total sugar content was maximum under control treatment. In Exp. II, the weight loss at spoilage was minimum under control treatment. Maximum level of soluble solids and titratable acidity was recorded with polyethylene wrapper + 10 p.p.m. GA. The level of total sugars and reducing sugars content was maximum with GA 30 p.p.m. and polyethylene wrapper alone. It can be inferred that Kinnow fruits can be stored afresh for a period of 12 and 16 days without any pre-treatment of wrapper under Exp. I. and II respectively. AA

PEACH

- 1582 HEIL (JR), CARROAD (PA), MERSON (RL) and LEONARD (S). Development of high vacuum flame processes for sliced peaches and pears. *J. Food Sci.* 48(4); 1983; 1106-12, 1123

Clingstone peach and Bartlett pear slices were successfully sterilized by high vacuum flame processes without the conventional covering of syrup or water. The processes developed are simple and continuous, and applicable to commercial use. With the exception of blanching and deaeration, the processes use existing canning practices. Through 18 months storage, more of the original flavour and texture of the fresh fruit was retained by HVFS packs than by the comparable conventional packs. No spoilage was experienced in any of the packs. AA

CUSTARD APPLE

- 1583 BEERH (OP), GIRIDHAR (N) and RAGHURAMAIAH (B). Custard apple (*Annona squamosa*). Part I. Physicomorphological characters and chemical composition. *Indian Food Packer*. 37(3); 1983; 77-81

Physico-morphological characters and chemical composition of custard apple fruits of 7 varieties (Washington PI-107005, Balanagar, Red Sitaphal, Washington PI-98797, Mammoth, Local Sitaphal, British Guinea) were studied. Fruits of variety Red Sitaphal and Mammoth had distinctly different outer colours, reddish and yellowish respectively, while other varieties had greenish colour. The fruit size was largest in Mammoth. The range of values for some constituents were: peel, 42.9 - 50.4%, fine pulp (100 mesh) 25.3 - 42.0%, carpellary pulp 3.9 - 10.6%, grit 2.0 - 3.2% and seed 3.4 - 8.4%. The number of seeds were maximum in Red Sitaphal and thickest in Washington PI-98797 and thinnest in Mammoth. The soluble solids were maximum in Mammoth, (28.0°brix) and lowest in Washington PI-107005, (20.6°brix). The total sugars varied from 14.9 to 21.6% with reducing sugars forming the major part of total sugars in most of the varieties. Custard apple fruits of all the varieties were poor source of vitamin C and pectin. AA

APPLE

- 1584 GOODENOUGH (PW), KESSELL (S), LEA (AGH) and LOEFFLER (T). Mono- and diphenolase activity from fruit of *Malus pumila*. *Phytochemistry*. 22(2); 1983; 359-63

Apple fruit used for beverage production has a polyphenol oxidase which does not hydroxylate-tyrosine under any conditions but it hydroxylates *p*-coumaric acid in the presence of NADH, and phloridzin in the absence of co-factors. The apparent K_m s for hydroxylation of phloridzin and *p*-coumaric acid are 1.5 and 4mM, respectively. However, subsequent oxidation of 3-hydroxyphloridzin or caffeic acid has an apparent K_m of 200 nM. The oxidation products of 3-hydroxyphloridzin are complex and a stable dimeric quinone is finally formed. The apparent K_m s for oxidation of catechin, epicatechin, chlorogenic acid, L-Dopa and 4-methyl catechol are 4.7, 5.7, 6.0, 2.7 and 3.2 mM respectively. The K_m for oxygen was 4.3% although there was marked substrate inhibition by oxygen above 30%. Polyphenol oxidase was stable at pH 3.5-4.5 with an optimum of 4.5. AA

GUAVA

- 1585 ADSULE (PG) and TANDON (DK). The assessment of LDPE bags for enhancing shelf life of guava. *Indian Food Packer*. 37(3); 1983; 82-7

Low density polyethylene (LDPE) bags with different thickness (gauges 200, 400, 600) were assessed for enhancing the storage life of guava (Cv. Allahabad Safeda) at ambient temperature (17-23 C). The data showed that there was significant increase in soluble solids and acidity with corresponding decrease in vitamin C, moisture and firmness (texture) during a storage period of 10 days. In fruits stored in open atmospheres (control as compared to fruits packed in LDPE bags. The fruits stored in 600 gauge LDPE bag had the highest organoleptic score and good marketability upto 10 days of storage. AA

- 1586 ULLAS (A) and RAWAL (RD). Guignardia fruit rot of guava / a new disease from Bangalore. *Curr. Sci.* 53(8), 1984; 435-6

FERONIA

- 1587 GUHA ROY and CHAUDHURI (S). Storage rot of *Feronia elephantum* Cor. caused by *Chlamydomyces palmarum* (Cooke) Mason in West Bengal. *Sci. Cult.* 49(5), 1983; 137-8

Chlamydomyces palmarum (Cooke) Mason, a hyphomyceteous fungus sp., has been isolated for the first time from rotten fruits of elephant apple, an important Indian tropical fruit. The disease appeared as blackish discolouration on skin surface which soon peeled off and the whole fruit turned black. At later stages, pale brown, loose cotton mycelial growth covered the entire surface particularly under higher humidity. Within the fruit, the pulp showed extensive brownish discolouration and dry rotting. It was found that bulk storage in heaps, high temperature and frequent water splashing favoured the disease. MVG

MELON

- 1588 SIDIBE (F). Prediction of the quality of melons by means of non-destructive measurements. *Ind. Aliment. Agric.* 100(6); 1983; 369-76 (French)

A high sugar content is a necessary requirement of high quality in melons. The authors have described some non-destructive tests that may help in determining the sugar content (or refractive index); namely, weight, equatorial circumference, height, hardness of skin, diameter of the calicinal scar, hardness of the skin at the level of the calyx. The results obtained with both destructive and non-destructive tests have been compared. KMD

SUGAR, STARCH AND CONFECTIONERY

MOLASSES

- 1589 DUARTE-COELHO (A), DUMOULIN (E) and GUERIN (B). Study of the correlation between the physical properties of molasses residues. *Ind. Aliment. Agric.* 100(7-8); 1983; 483-6 (French)

With a view to regulating the operation of a molasses concentration unit, the authors have established certain correlations between some physical properties of these residues and their dry matter content, in the range of 10-55% dry matter. Specific gravity, refractive index, and thermal capacity varied linearly with the dry matter content, while the boiling point elevation was exponentially related to dry matter content. KMD

JAGGERY

- 1590 SHINDE (BN), MARATHE (AB), JAVALEKAR (DV) and KADAM (SK). Effect of neutralisation of sugarcane juice acidity on the keeping quality of jaggery during storage. *Indian Sugar.* 33(5); 1983; 315-8

In jaggery (crude brown sugar) production, keeping the reducing sugar levels low is an important requirement. However, rise in reducing sugars during boiling attributed to increased acidity and high temperature, renders it uneconomical for the extraction of sucrose from the jaggery. Neutralisation of juice acidity by salts like CaCO_3 and NaCO_3 keeps the reducing sugars at the lowest level, thus offering a good possibility of utilising the excess sugar cane by converting into jaggery and using it for production of sugar during off season. MVG

STARCH

- 1591 STEVENS (J) and EVERS (AD). The mechanism and significance of starch damage. *Getreide Mehl Brot.* 37(4); 1983; 101-6 (German)

Though the concept of "starch damage" has spread far and wide, it has not yet been properly defined. This problem has been described in detail and investigated in many areas; nevertheless, further research is needed to remove the anomalies that exist at present. A better understanding of the process by which starch is damaged, and its significance in dough preparation and bread-making would help both the milling technologist and the starch chemist. KMD

- 1592 MAHER (GG) Alkali gelatinisation of starches. *Starch.* 35(7); 1983; 226-34

- 1593 THARANATHAN (RN), PARAMAHANS (SV) and TAREEN (JAK). *In vitro* digestibility of native starch granules of samai and sanwa. *Starch.* 35(7); 1983; 235-6

The *in vitro* digestibility of native samai and sanwa starch granules with glucoamylase and salivary α -amylase has revealed a range of enzyme degradation patterns on scanning electron microscopy. AA

- 1594 KLAUSHOFER (Von H) and BLEIER (J). Experiments for the structural analysis of citrate starches. Part 3. Results of degradation experiments with amylolytic enzymes. *Starch.* 35(7); 1983; 237-42 (German)

CONFECTIONERY

- 1595 BOOTHBY (L). Edible fats in confectionery production. *Confect. Prod.* 49(8) 1983; 411-2

Discusses: important factors; fractionation; hydrogenation; interesterification; chocolate and confectionery fats; cream fats; toffee-caramel fats; biscuit dough fats; and blending of fats. BSN

CANDY

- 1596 CHALMERS (AJ). Hard candy - processing and quality observations. *Manuf. Confect.* 63(5); 1983; 49-52, 54, 56

The types of hard candy, the processing method along with ingredients used and the precautions to be observed for getting a high gloss satin candy have been discussed. BSN

CHOCOLATE

- 1597 ROBBINS (JW). Methods for measuring particle size distribution of chocolate products. *Manuf. Confect.* 62(6); 1983; 185-90

Discusses: size and distribution against large particle size; importance of particle shape/sample size; analysis of large particles; and recommended procedures. BSN

- 1598 HURST (WJ), MCKIM (JM) and MARTIN (RA) Jr. The HPLC analysis of thiamin in milk chocolate. *Int. J. Vitaminol. Nutr. Res.* 53(3); 1983; 239-42

An HPLC method for the analysis of thiamin in milk chocolate and various chocolate products is described. Samples are extracted with H_2SO_4 , treated with enzymes and interferences removed with a small cleanup column. The separation is effected on a monolayer reversed phase column with a post column thiochrome reaction and fluorescence detection. The method is accurate and precise. AA

BAKERY PRODUCTS

- 1599 SMITH (JP), JACKSON (ED) and OORAIKUL (B). Storage study of a gas-packaged bakery product. *J. Food Sci.* 48(4); 1983; 1370-71, 1375

English style crumpets were packaged in the atmosphere of CO_2 and N_2 (3:2) and stored at 20, 22, 24 and 30 C. In all cases, package volume and headspace CO_2 concentration decreased during the first week of storage. At 30 C, the volume started to increase after 12 days due to production of CO_2 and other metabolites by microorganisms. At 24 C, the volume did not start to increase until after 25 days, while at 22 and 20 C it remained stable or gradually decreasing. Aerobic plate counts and metabolites were higher in the product stored at 30 C for 19 days than those stored at 20 C for 1 month. Product pH after 1 month at 20 C was lower (5.9) than that at 30 C for 19 days (6.5) due, essentially, to the absorption of CO_2 . AA

BREAD

- 1600 MEUSER (F). Comparative studies on sour dough fermentation in industrial and artisanal bakeries. *Getreide Mehl Brot.* 37(4); 1983; 120-26 (German)

Optimization of sour dough fermentation for the production of a uniformly acidified bread with acceptable sensory properties has been achieved with the help of microprocessors in two kinds of large bakeries: a) those with a conventional, multi-stage, sour dough development which produce a bread of high quality as well as a wide assortment of other baked goods in varying quantities; and b) those having a continuous, bread producing line using a single type of sour dough. The small, artisanal bakeries should adopt the single-stage dough fermentation procedure, with facilities for the storage of acid dough. The simplest solution for them is to adopt the Isernhager process. KMD

- 1601 MARSTON (PE). Moisture content and migration in bread incorporating dried fruit. *Food Technol. Aust.* 35(10); 1983; 463-5

Bread containing raisins and currants at 60-70% of the weight of flour was made from a dough of medium richness. Results on moisture changes are presented and ways of restricting the migration of water from the bread crumb to the fruit are discussed. KAR

- 1602 CADDEN (AM), SOSULSKI (FW) and OLSON (JP). Physiological responses of rats to high fiber bread diets containing several sources of hulls or brans. *J. Food Sci.* 48(4); 1983; 1151-6

Fiber-supplemented breads, prepared by replacing 7.5% of the hard wheat flour with field pea, flax or sunflower hulls, wheat bran or microcrystalline cellulose, were evaluated for breadmaking characteristics and physiological effects on rats. Cellulose-supplemented dough and bread resembled the straight grade wheat bread while pea hull and wheat bran breads were similar to whole wheat bread. Flax and sunflower hulls had adverse effects on dough mixograph properties, loaf volume and crumb characteristics while sunflower hulls also contributed grittiness and aftertaste in taste panel evaluations. The fiber-supplemented breads, when fed to weanling rats, gave similar feed consumptions, weight gains and serum cholesterol levels as rats fed the whole wheat bread. Pea hulls increased daily fecal weight and, with coarse sunflower hulls, decreased dry matter digestibility. Fine wheat bran and fine sunflower hulls in the bread diets were associated with low fecal weight, low fecal volume, high fecal density and high digestibility of dry matter. AA

- 1603 WYATT (CJ). Acceptability of reduced sodium in breads, cottage cheese, and pickles. *J. Food Sci.* 48(4); 1983; 1300-302

Salt was reduced in cottage cheese and white and whole wheat breads. Commercial dill and sweet pickles with reduced salt were also included. Acceptability of these foods was determined. Salt in bread was reduced to 50% of the normal level with no significant effect on overall desirability. Cottage cheese with lower levels of salt was affected by salt content of contrast effect. No significant differences in mean scores for reduced sodium pickles were observed. Sodium and potassium content was determined by flame photometry. Reducing the salt content of foods alters the Na:K ratio. AA

BISCUIT

- 1604 OSBORNE (BG), FEARN (T), MILLER (AR) and DOUGLAS (S). Application of near infrared reflectance spectroscopy to the compositional analysis of biscuits and biscuit doughs. *J. Sci. Food Agric.* 35(1); 1984; 99-105

The work was intended to find out whether N.I.R. could be used for monitoring of automatic metering equipment used for fat, sucrose, dry flour and water in short dough biscuit production. The N.I.R. method was found to be precise for all the 4 constituents. Calibrations for fat were, however, accurate enough for detecting metering errors of $\pm 5\%$ relative to the total amount of fat in recipe. JVS

NOODLE

- 1605 OH (NH), SEIB (PA), DEYOE (CW) and WARD (AB). Noodles. I. Measuring the textural characteristics of cooked noodles. *Cereal Chem.* 60(6); 1983; 433-8

Maximum cutting stress and resistance to compression were observed in Instron universal testing instrument trials which reproduced coefficients of variation of less than 5% in noodles prepared with optimum cooking time and a subsequent standing period of 10 minutes at 25 C. Wide variation in shear values were observed for noodles made from eight wheat flours. Coefficients of 0.888 ($P < 0.01$) and 0.848 ($P < 0.01$) were observed when sensory evaluation of firmness and chewiness of noodles were correlated with maximum cutting stress and resistance to compression respectively. BSN

MILK AND DAIRY PRODUCTS

MILK

- 1606 SWARTZEL (KR). A method for predicting gelation of aseptically packaged steam injected UHT milk. *J. Food Sci.* 48(4); 1983; 1376-7

The gelation of sterile UHT steam injected dairy products was investigated by determining the time of gelation onset and the gelation rate. Fat percentages of the products were 0.5, 3.25, and 10.5. Each product was processed at 411 K for 20.3 seconds, 416 K for 6.9 and 20.3 seconds and 422 K for 3.4, 6.9, and 20.3 seconds. Products were stored at 277 and 297 K. Viscosity measurements were taken with four commercial viscometer assemblies and viscosity data compiled at a shear rate of 1 sec⁻¹. Velocity rate constants (k) were determined using regression analysis. Prediction equations were formulated for the time of gelation onset and the rate of gelation depending on the severity of the thermal treatment, percent fat and storage temperature. AA

- 1607 BAKER (SK). The keeping quality of refrigerated pasteurized milk. *Aust. J. Dairy Technol.* 38(3); 1983; 124-7

The total number of bacteria present before or immediately after pasteurization of milk are poorly correlated with the shelf life of that milk during storage at temperatures between 0 C and 12 C. The lower the storage temperature, the longer the milk remains acceptable; and the longer the period before the milk becomes unacceptable, the greater the total number of bacteria. That no specific bacteria cause spoilage of stored milk is confirmed by experiments in which different bacterial species were found to proliferate at different temperatures. Indeed, tests of bacterial growth alone cannot fully explain the onset of spoilage, particularly at temperatures below 3 to -4 C. At these temperatures, it is evident that proteolysis of milk by thermostable protease (s) is responsible for deterioration of the milk. The prepasteurization history of the milk determines to a large extent the subsequent shelf life of the pasteurized milk. AA

- 1608 BERTSCH (AJ). Surface tension of whole and skim-milk between 18 and 135 C. *J. Dairy Res.* 50(3); 1983; 259-67

The surface tension (γ) of whole milk (4% fat) and skim milk was determined in the temperature range 18-135 C by the drop number method. Measurements were carried out in a temperature-controlled chamber under pressure. Above 90 C, the mean residence time of the milk at the test temperature was 15 s. Surface tension values were calculated by the Harkins and Brown method, corrections being made to account for the kinetic energy of the drops. The results for whole and skim-milk were not significantly different and the combined data (66 values) could be represented by the equation: $\gamma = 1.8 \cdot 10^{-4} \theta^2 - 0.163 \theta + 55.6$, (where γ is in mN.m⁻¹ and θ is the temperature in C) with a residual s.d. of 2.1 mN.m⁻¹ (mean relative error 9.6% at the 5% level of significance). AA

- 1609 VOUTSINAS (LP) and NAKAI (S). Coagulation of skim milk with proteases immobilized on hydrophobic carriers. *J. Dairy Sci.* 66(4); 1983; 694-703

- JENKINS (KJ) and EMMONS (DB). Inhibitory effects of fatty acids, chelating agents, and other substances on rennet clotting of skim milk. *J. Dairy Sci.* 66(4); 1983; 719-26
- 1611 HARWALKAR (VR), BECKETT (DC), McKELLAR (RC), EMMONS (DB) and DOYLE (GE). Age-thickening and gelation of sterilized evaporated milk. *J. Dairy Sci.* 66(4); 1983; 735-42
- 1612 ANDREWS (AT) and ALICHANIDIS (E). Proteolysis of caseins and the proteose-peptone fraction of bovine milk. *J. Dairy Res.* 50(3); 1983; 275-90
- 1613 ANDERSON (M) and NEEDS (EC). Serum lipoprotein stimulation of lipolysis and its relevance to free fatty acid development in bovine milk. *J. Dairy Res.* 50(3); 1983; 309-19
- 1614 SWEETSUR (AWM) and MUIR (DD). Effect of homogenization on the heat stability of milk. *J. Dairy Res.* 50(3); 1983; 291-300
When heated at 140 C, time taken for forming protein clots in homogenized milk, was reduced with increasing pressure in the range 3.5-34.5 MPa. Milk samples obtained in summer showed greater stability than those for milk samples of winter months. The destabilizing effect could be partly offset by 2-stage, homogenization (20.7 MPa followed by 3.5 MPa), addition of phosphate stabilizers (0.08% w/v) or homogenization at a high temperature (65 C). By addition of Ca phosphate stabilizers, sulphydryl-blocking and oxidizing agents, homogenized and unhomogenized milks reacted similarly; effects of season addition of urea or formaldehyde were different for homogenized milk. BSN
- 1615 SWEETSUR (AWM) and MUIR (DD). Influence of sulphydryl group interactions on the heat stability of homogenized concentrated milk. *J. Dairy Res.* 50(3); 1983; 301-8
- 1616 KORYCKA-DAHL (M), DUMAS (BR), CHENE (N) and MARTAL (J). Plasmin activity in milk. *J. Dairy Sci.* 66(4); 1983; 704-11
- 1617 DAGLEISH (DG). Coagulation of rennetted bovine casein micelles: Dependence on temperature, calcium ion concentration and ionic strength. *J. Dairy Res.* 50(3); 1983; 331-40
- 1618 EL-BARBARY (ASA), AL-HAKIM (MK) and ISSA (HH). Studies on milk composition of karadi cows. *Indian Vet. J.* 60(4); 1983; 291-6
- 1619 HUDSON (GJ) and LUCAS (A). Nitrogen content of human milk: Limitations of spectrophotometry for the determination of protein in milk. *J. Dairy Res.* 50(3); 1983; 269-74
Applicability of Nakai and Chile (1970) rapid method for determination of N content of bovine milk based on closed correlation of absorbance at 280 nm for human milk samples has been investigated. The limitations of the procedure are (1) dependence of relation between absorbance value and N content on both the mode of collection and postnatal age of the donor, and (2) variable interference by nonprotein components of milk. BSN
- 1620 NEEDS (EC), FORD (GD), OWEN (AJ), TUCKLEY (B) and ANDERSON (M). A method for the quantitative determination of individual free fatty acids in milk by ion exchange resin adsorption and gas-liquid chromatography. *J. Dairy Res.* 50(3); 1983; 321-9

The rapid routine method for analysis of individual free fatty acids (FFA) in milk, involves extraction of lipid in milk in ether, shaking the extract with anion exchange resin Amberlyst-26, methylation directly or resin bound FFA and quantification of individual FFA by GLC employing internal standards. Data obtained revealed that individual acids on an average, were found to be within 6% of the original amount present in the mixture. On repeated extraction of a single milk sample, an average coefficient of variation of 4.3% was obtained. BSN

- 1621 RETTENMAIER (R) and VUILLEUMIER (JP). A simple method for the determination of riboflavin in human milk. *Int. J. Vitaminol. Nutr. Res.* 53(1); 1983; 32-5
Reports a fluorometric method for estimation of total riboflavin in human milk, based on hydrolysis of Flavin-adenine dinucleotide to riboflavin by an enzyme and measurement of fluorescence in the aqueous phase at pH 4.5. The coefficient of variation was observed to be 2.48% (n = 58). This simple, reproducible procedure enables simultaneous analysis of a number of samples. The recoveries were found to be in the range of 95.8-100.8%. BSN
- 1622 KERR (TJ), WILLIAMS (MV), ROWE (JJ), TRITZ (GJ) and WASHAM (CJ). Detection and characterization of a nicotinic acid-replacing substance in vitamin-free acid hydrolyzed casein. *J. Dairy Sci.* 66(4); 1983; 743-9
- 1623 KERR (TJ), WILLIAMS (MV), TRITZ (GJ) and WASHAM (CJ). Purification and identification of a nicotinic acid-replacing substance from vitamin-free acid hydrolyzed casein. *J. Dairy Sci.* 66(4); 1983; 750-55
- 1624 MISTRY (VV) and KOSIKOWSKI (FV). Application of dialysis to measure protease activity in milk. *J. Dairy Sci.* 66(4); 1983; 687-93
- 1625 STIJVE (T). Gas chromatographic determination of butylated hydroxytoluene (BHT), butylated hydroxyanisole (BHA) and tert-butylhydroquinone (TBHQ) in milk products. *Dtsch. Lebensmittel-Rundschau.* 79(4); 1983; 108-10
- 1626 WICKSTROM (K), PYYSALO (H) and SIIMES (MA). Levels of chlordan, hexachlorobenzene, PCB and DDT compounds in Finnish human milk in 1982. *Bull. Environ. Contam. Toxicol.* 31(3); 1983; 251-6
- 1627 RYSSTAD (G) and ABRAHAMSEN (RK). Fermentation of goat's milk by two DL-type mixed strain starters. *J. Dairy Res.* 50(3); 1983; 349-56
- 1628 REIF (GD), FRANKE (AA) and BRUHN (JC). Retail dairy foods quality: An assessment of the incidence of off-flavours in California milk. *Dairy Food Sanit* 3(2); 1984; 44-6
- 1629 MURRAY (SK), KWAN (KKH), SKURA (BJ) and McKELLAR (RC). Effect of nitrogen flushing on the production of proteinase by psychrotrophic bacteria in raw milk. *J. Food Sci.* 48(4); 1983; 1166-9
- 1630 MARSHALL (VM) and COLE (WM). Threonine aldolase and alcohol dehydrogenase activities in *Lactobacillus bulgaricus* and *Lactobacillus acidophilus* and their contribution to flavour production in fermented milks. *J. Dairy Res.* 50(3); 1983; 375-9

- 1631 TORRIE (JP), CHOLETTE (H), FROEHLICH (DA) and McKELLAR (RC). Growth of an extracellular proteinase-deficient strain of *Pseudomonas fluorescens* on milk and milk proteins. *J. Dairy Res.* 50(3); 1983; 365-74
- 1632 LOVETT (J), FRANCIS (DW) and HUNT (JM). Isolation of *Campylobacter jejuni* from raw milk. *Appl. Environ. Microbiol.* 46(2); 1983; 459-62
Campylobacter jejuni was isolated from raw milk by a method that can routinely detect ≤ 1 organism per ml. This procedure was used in a survey of 195 separate farms and showed a 1.5% incidence of *C. jejuni* in milk from bulk tanks. AA
- 1633 ANDREWS (WH), WILSON (CR) and POELMA (PL). Improved *Salmonella* species recovery from nonfat dry milk pre-enriched under reduced rehydration. *J. Food Sci.* 48(4); 1983; 1162-5
- 1634 CHAVARRI (FJ), NUNEZ (JA) and NUNEZ (M). Behaviour of *Streptococcus lactis* in heat treated (80 C for 30 minutes) or sterilized cow's and ewe's milk. *J. Dairy Res.* 50(3); 1983; 357-63
 Generation times and acid production after 6 and 24 hours by 20 strains of *Streptococcus lactis* of dairy origin were determined in heat treated (80 C for 30 minutes) and sterilized cow's and ewe's milk. Ewe's milk enhanced growth of the streptococci, with significantly ($P < 0.001$) shorter generation times and higher acid production after 6 hours incubation than cow's milk, probably due to its higher vitamin content. The stronger buffer capacity of ewe's milk allowed a higher ($P < 0.001$) acid production after 24 hours than cow's milk. A stimulatory effect of sterilization on generation time and acid production after 24 hours was observed in cow's milk. However, the heat treated ewe's milk was shown to be a better substrate than sterilized ewe's milk for *S. lactis*. AA

CURD

- 1635 GREEN (ML), MARSHALL (RJ) and GLOVER (FA). Influence of homogenization of concentrated milks on the structure and properties of rennet curds. *J. Dairy Res.* 50(3); 1983; 341-8

WHEY

- 1636 SKUDDER (PJ). Recovery and fractionation of proteins from cheese whey using a porous silica-based ion-exchange medium. *Chem. Ind.* 21; 1983; 811-4
 Discusses ion-exchange medium; adsorption of protein during passage of whey; effect of flow rate on adsorption process; effect of pH; recovery of adsorbed protein using HCl; composition of acid eluates; and fractionation of whey proteins. BSN
- 1637 PEARCE (RO). Analysis of whey proteins by high performance liquid chromatography. *Aust. J. Dairy Technol.* 38(3); 1983; 114-7
 By employing short alkyl chain (C6) reverse phase column with an acid saline/acetonitrile gradient, the major whey proteins bovine serum albumin, α -lactalbumin and β -lactoglobulin have been completely resolved in a 30 minutes analysis. By this, even subtle changes in the whey protein which have occurred as a result of processing could be detected. KAR

- 1638 BAKSHI (AS) and JOHNSON (RM). Calorimetric studies on whey freeze concentration. *J. Food Sci.* 48(4); 1983; 1279-83
- 1639 MITCHELL (SL) and GILLILAND (SE). Pepsinized sweet whey medium for growing *Lactobacillus acidophilus* for frozen concentrated cultures. *J. Dairy Sci.* 66(4); 1983; 712-8

CHEESE

- 1640 EDWARDS (J) and KOSIKOWSKI (FV). Bitter compounds from cheddar cheese. *J. Dairy Sci.* 66(4); 1983; 727-34
- In cheddar cheese rendered bitter by milk coagulating agents, bitter peptides were isolated. Each coagulant produced more than one bitter peptide. Bitter peptides contained relatively large amounts of aliphatic, acidic and hydroxyamino acids and also small amounts of basic and aromatic acids. In all of them, the most consistent amino acids were glutamic acid, proline, leucine and valine. BSN
- 1641 MARCOS (A), ESTEBAN (MA), ALCALA (M) and MILLAN (R). Prediction of water activity of San Simon cheese. *J. Dairy Sci.* 66(4); 1983; 909-11
- 1642 AHMED (AA-H), MOUSTAFRA (MK) and MARTH (EH). Growth and enterotoxin production by *Staphylococcus aureus* in whey from the manufacture of Domiati cheese. *J. Food Prot.* 46(3); 1983; 235-7

MEAT AND POULTRY

- 1643 KURTH (L) and SHAW (FD). Identification of the species of origin of meat by electrophoretic and immunological methods. *Food Technol. Aust.* 35(7); 1983; 328-31
- 1644 TANTIKARNJATHEP (K), SEBRANEK (JG), TOPEL (DG) and RUST (RE). Use of vacuum during formation of meat emulsions. *J. Food Sci.* 48(4); 1983; 1039-41
- Meat emulsion formation under vacuum was studied in a model system and in a sausage emulsion. Sarcoplasmic and myofibrillar extracts from beef and pork infraspinatus muscle were used to compare emulsification of vegetable oil with or without vacuum. Vacuum treatment permitted more oil to be emulsified by all protein extracts; proportional increase was greater for water-soluble than for salt-soluble extracts. Sausage emulsion was evaluated using frankfurters prepared in a vacuum chopper with or without vacuum. Product stability was improved by application of vacuum only for the entire chopping procedure. Cured colour development was more rapid and more complete in the vacuum treatment. Without vacuum chopping, frankfurters showed more obvious cavitation and less density, confirming presence of air within the emulsion. AA
- 1645 SIMARD (C), CASTAIGNE (F) and BOUDREAU (A). Predicting the texture of sausage containing soy protein from their emulsifying capacity and efficiency. *Sci. Aliment.* 3(2); 1983; 299-309 (French)
- Soyabean proteins with known emulsifying capacity and emulsifying efficiency were treated at different temperatures and partially substituted for

meat in sausage manufacturing. We obtained a high correlation between the three following factors: emulsifying capacity, emulsifying efficiency and temperature, and sausage elasticity. After examining the various fractions of soyabean proteins, we found that the 7 S fraction would be responsible for hydration and water retention at a high temperature, and consequently, for sausage elasticity. AA

- 1646 HAUSCHILD (AHW) and HILSHEIMER (R). Prevalence of *Clostridium botulinum* in commercial liver sausage. *J. Food Prot.* 46(3); 1983; 242-4

- 1647 NOTERMANS (S), BOOT (R), TIPS (PD) and DE NOOIJ (MP). Extraction of Staphylococcal enterotoxins (SE) from minced meat and subsequent detection of SE with enzyme-linked immunosorbent assay (ELISA). *J. Food Prot.* 46(3); 1983; 238-241, 244

ELISA (enzyme-linked immunosorbent assay) was employed to demonstrate staphylococcal enterotoxins A, B, C and E (SEA, SEB, SEC and SEE) in minced meat (50% beef/50% pork). For unheated minced meat, extraction of the sample with an equal amount of distilled water at pH 4.5 and a subsequent concentration (10-fold) of the extract, readjusted to pH 7.2, was sufficient to detect less than 0.5 µg of SE per 100 g of product. The extraction procedure gave 40-80% recovery of the toxin, and using the ELISA system neither false-positive nor false-negative results were observed. Using the just mentioned extraction procedure, recovery of SE that had been heated in minced meat was low (0.14% for SEB). It was demonstrated that components extracted by heating (among others, gelatin), present in minced meat caused immunological inactivation of SEB, SEC and SEE during heating. From monkey-feeding tests it became clear that the immunological inactivation of SEB in gelatin by heating was accompanied by biological inactivation. AA

BEEF

- 1648 FISHER (AV) and BAYNTUN (JA). Weight loss from beef sides during storage post mortem and its effects on carcass composition. *Meat Sci.* 9(2); 1983; 121-9

- 1649 SCHRICKER (BR) and MILLER (DD). Effects of cooking and chemical treatment on heme and nonheme iron in meat. *J. Food Sci.* 48(4); 1983; 1340-43, 1349

Treatment of ground beef samples with heat (conventional and microwave) ascorbic acid, or H₂O₂ increased nonheme iron concentrations. The increases ranged from less than 10% to more than 100% depending on the type, length, and severity of the treatment. Cooking of fresh beef round using common household methods (braising, roasting, microwave cooking) resulted in nonheme iron increases that were generally less than 10%. Treatment of heme and meat extract solutions with heat and H₂O₂ resulted in destruction of the iron-porphyrin complex. Oxidative cleavage of the porphyrin ring followed by release of the iron is probably the mechanism for the observed increases in nonheme iron. AA

- 1650 GALT (AM) and MAC LEOD (G). The application of factor analysis to cooked beef aroma descriptors. *J. Food Sci.* 48(4); 1983; 1354-5

Factor analysis was applied to previously published data; the analysis showed that the sensory properties of cooked beef aroma can be described by nine factors. AA

- 1651 CROSS (HR), GILLILAND (DA), DURLAND (PR) and SEIDEMAN (S). Beef carcass evaluation by use of a video image analysis system. *J. Anim. Sci.* 57(4); 1983; 908-17
- 1652 HANNA (MO), SAVELL (JW), SMITH (GC), PURSER (DE), GARDNER (FA) and VANDER-ZANT (C). Effect of growth of individual meat bacteria on pH, colour and odour of aseptically prepared vacuum-packaged round steaks. *J. Food Prot.* 46(3); 1983; 216-21, 225
- Large increases in counts of *Leuconostoc* spp., *Lactobacillus coryneformis*, *Lactobacillus plantarum*, *Lactobacillus viridescens* and *Lactobacillus curvatus* occurred over a 28-days display period when aseptically fabricated steaks were inoculated with 10^3 to 10^4 cells/cm² of these species and then were vacuum-packaged. With *Lactobacillus cellobiosus* 2, *Serratia liquefaciens* or *Hafnia alvei* as inoculum, increases in count were much smaller. Counts of *L. cellobiosus* 1, *Brochothrix thermosphacta*, a *Moraxella* sp. and *Alteromonas putrefaciens* of inoculated steaks decreased during display. With a higher inoculum (10^6 cells/cm²), increases in counts of lactic acid bacteria usually were smaller. Some lactic acid bacteria caused marked decreases (0.2 to 0.5) in the pH of the meat surface. Changes in surface discolouration of uninoculated and inoculated steaks over a 28-days display period were not significant ($P > 0.05$). Off-odour scores of both uninoculated and inoculated steaks were lower (more off-odour), after display but few of the differences were significant. Off-odours of steaks inoculated with lactic acid bacteria were described as "sour", "butter-milk", "sulphur-like" and "H₂S". AA
- 1653 NAIR (KKS), MADHWARAJ (MS), KADKOL (SB), BALIGA (BR) and MOORJANI (MN). Microbial examination of meat of buffalo (*Bubalus bubalis* Linn) for the presence of *Salmonella* and staphylococci. *Indian Vet. J.* 60(3); 1983; 189-92
- Buffalo carcasses were examined for *Salmonella* and staphylococci. The *Salmonella* isolated belonged to *S. newport*. All the buffalo carcasses examined contained *Staphylococcus aureus*. Out of the 70 strains of coagulase positive, *S. aureus* subjected to phage-typing, only 23 could be phage-typed. They belonged to phage groups II, III and IV. AA

LAMB

- 1654 WOOD (JD), MacFIE (HJH) and BROWN (AJ). Effects of body weight, breed and sex on killing-out percentage and non-carcass component weights in lambs. *Meat Sci.* 9(2); 1983; 89-99

PORK

- 1655 BURSON (DE), HUNT (MC), SCHAFER (DE), BECKWITH (D) and GARRISON (JR). Effects of stunning method and time interval from stunning to exsanguination on blood splashing in pork. *J. Anim. Sci.* 57(4); 1983; 918-21
- 1656 SCHAEFER-ZEIDLER (CE), JUDGE (MD) and ABERLE (ED). Moisture losses during chilling from the skin surface of scalded pork carcasses. *J. Food Sci.* 48(4); 1983; 1350-51
- The proportion of cooler shrinkage attributable to moisture loss from the skin of scalded, dehaired pork carcasses was estimated. Mean carcass cooler shrinkage was 1.91% during a 24 hours chill at -2 °C. Approximately

80% of the cooler shrinkage was moisture endogenous to the skin. Thus, only 20% of total cooler shrinkage originated from the muscle and adipose tissue. Moisture was not absorbed in significant quantities by the skin during the scalding, dehairing and carcass washing process. Greater cooler shrinkage reported for scalded than for skinned pork carcasses was mostly a consequence of the widely different moisture content of the skin surface of scalded carcasses versus that of the adipose tissue surface of skinned carcasses. AA

- 1657 JOHNSON (WA) and DEETHARDT (DE). Nutrient content and edible yield of selected cuts of cooked pork. *J. Food Sci.* 48(4); 1983; 1352-3

Analysis of lean-type pork cooked by standard methods showed that cooking to a final internal temperature of 77 C for fresh cuts, and 71 C for cured meats resulted in increased amounts of several essential nutrients. Edible yield was similar to that reported from earlier studies, while amounts of internal fat were somewhat lower. Levels of thiamin, riboflavin and niacin and of several minerals were found to be slightly higher than Handbook 8 values. Cobalamin and zinc from 100 g of edible lean would provide approximately 10% and 20-35% of the respective recommended daily allowances. Iron contents were lower than previously reported for pork. AA

- 1658 CACCIARELLI (MA), STRINGER (WC), ANDERSON (ME) and NAUMANN (HD). Effects of washing and sanitizing on the bacterial flora of vacuum-packaged pork loins. *J. Food Prot.* 46(3); 1983; 231-4

- 1659 JUDGE (MD) and COUSIN (MA). Psychrotrophic bacteria in prerigor ground pork. *J. Food Sci.* 48(4); 1983; 1348-9

The numbers of psychrotrophic bacteria in prerigor ground pork were slightly greater than in postrigor ground pork throughout an 11-day storage period at 2 C. Freezing both types of samples and subsequent thawing before storage at 2 C reduced the initial psychrotrophic counts but the freezing effects did not persist beyond 8 days of storage. Differences in psychrotrophic counts between prerigor and postrigor ground pork were not sufficiently great in any comparison to limit the use of prerigor grinding of pork. AA

- 1660 CHADWICK (JP) and KEMPSTER (AJ). A repeat national survey (ten years on) of muscle pH values in commercial bacon carcasses. *Meat Sci.* 9(2); 1983; 101-11

- 1661 PEDRIELLI (R). Processing technology of cooked ham. *Ind. Conserve.* 58(3); 1983; 150-57 (Italian)-

The effect of curing brine composition on the yield of cooked ham is closely related to the amount of injected brine and the internal temperature attained. At a core temperature of 66 C, the effect of sodium tripolyphosphate (TPP) on water-holding capacity is significantly different from that of trisodium citrate only for injection percentages higher than 15; at 70 C the different effects of the two salts are evident even for low injection percentages. Within the range of the injection percentages examined an increase in the amount of injected brine can be utilized to obtain increased yields: if the brines contain TPP, optimum injection percentage appears to be in the range 30-33%, whereas with citrate-containing brines increases in the yield are obtainable with injections up to 20%. A rise in the internal temperature always lowers the yield; unlike citrate, TPP considerably reduces this effect. No statistically significant differences ($P > 0.05$) were observed when citrate was used at two levels, viz. 0.35 and 0.70% of the weight of boned injected meat. AA

- 1662 MILBOURNE (K). Thermal tolerance of *Lactobacillus viridescens* in ham. *Meat Sci.* 9(2); 1983; 113-9
- 1663 BELLATTI (M), DAZZI (G), CHIZZOLINI (R), PALMIA (F) and PAROLARI (G). Physical and chemical modifications of protein during the maturation of Parma ham. I. Biochemical and functional transformations. *Ind. Conserve.* 58(3); 1983; 143-6 (Italian)
- Thirty-six pork thighs, selected for processing into Parma ham at the time of slaughter, were chilled for 24 hour at 0 C, dry salted with two slightly different amounts of NaCl, and then allowed to mature for one year. The hams were analysed - when in the green state, and after different periods of maturation - for : a) salt, ash, total N, and moisture; (b) extractable N, both total and non-protein; (c) ATPase activity, with and without Ca^{++} ; (d) total and non-protein SH-groups; and (e) adsorption isotherm of dialyzed and freeze-dried muscle proteins. During the initial stage of cold storage, there appears to be some denaturation of the sarcoplasmic proteins; ATPase activity and SH-residues were also affected to a great extent at this stage. Later on, when the temperature is higher, some break-down of sarcoplasmic and myofibrillar proteins occurs. The changes that occurred in the two batches treated with different quantities of salt were the same. KMD
- 1664 PAROLARI (G), CHIZZOLINI (R), BELLATTI (M) and DAZZI (G). Physical and chemical modifications during the maturation of Parma ham - II. Colour. *Ind. Conserve.* 58(3); 1983; 147-9 (Italian)

When mature, Parma ham develops a deep red colour, even in the absence of added nitrate, and this colour is stable after slicing also. The colour may be due to specific myoglobin reducing systems, or to iron-binding external ligands capable of forming a stable, octahedral, low-spin complex. Both these hypotheses were tested by comparing the spectral behaviour of 36 hours prepared without nitrate or nitrite. The results indicate a chemical change in the pigment, but do not permit definition of the precise chemical nature of the modified pigment. KMD

RABBIT

- 1665 LUKEFAHR (S), HOHENBOKEN (WD), CHEEKE (PR) and PATTON (NM). Appraisal of nine genetic groups of rabbits for carcass and lean yield traits. *J. Anim. Sci.* 57(4); 1983; 899-907
- 1666 KANG (JO), ITO (T) and FUKAZAWA (T). Effect of frozen storage on the structure and enzymatic activities of myofibrillar proteins of rabbit skeletal muscle. *Meat Sci.* 9(2); 1983; 131-44

FRANKFURTERS

- 1667 MITTAL (GS) and BLAISDELL (JL). Weight loss in frankfurters during thermal processing. *Meat Sci.* 9(2); 1983; 79-88
- 1668 SIMARD (RE), LEE (BH), LALEYE (CL) and HOLLEY (RA). Effects of temperature, light and storage time on the physicochemical and sensory characteristics of vacuum- or nitrogen-packed frankfurters. *J. Food Prot.* 46(3); 1983; 188-95, 198

- 1669 SIMARD (RE), LEE (BH), LALEYE (CL) and HOLLEY (RA). Effects of temperature, light and storage time on the microflora of vacuum- or nitrogen-packed frankfurters. *J. Food Prot.* 46(3); 1983; 199-205, 209
- 1670 FOX (JB) Jr., JENKINS (RK) and ACKERMAN (SA). Texture of emulsified cooked meat products by three different methods of measurement. *J. Food Sci.* 48(4); 1983; 1025-30

A comparison was made of Warner-Bratzler (W-B) shear with penetration and compression tests of the texture of frankfurters undergoing textural deterioration during storage in vinegar pickle. The various measurements were linearly covariant but the intercepts were finite, indicating the different tests were not measuring the same properties in the same proportions. Covariant plots of W-B shear of whole frankfurters and penetration of the interior gel showed that the skin did not deteriorate to the extent of the interior emulsion did. Covariant plots of work and maximum force values for all three techniques showed that the maximum stress forces decreased more rapidly than did the average work function during storage in pickle. AA

CHICKEN

- 1671 MAST (MG) and MACNEIL (JH). Effect of kosher vs conventional processing on yield, quality, and acceptability of broiler chickens. *J. Food Sci.* 48(4); 1983; 1013-5, 1024

Broiler chickens processed in commercial plants using either conventional or kosher procedures were compared for yields and quality attributes. Conventionally processed chicken had greater water uptake during immersion chilling and lost more weight during storage. Due to the salting or "koshering" process, meat and skin of kosher chicken had four to six times as much sodium as nonkosher poultry. Perhaps as a reflection of the higher sodium content, kosher poultry meat generally was rated higher for overall acceptability; however, these differences were not always statistically significant. Breast meat from kosher poultry was also more tender than nonkosher breast, as evaluated by sensory techniques and shear tests. Although generally not significantly different, kosher poultry exhibited slightly higher TBA values and lower microbial numbers than nonkosher poultry. AA

- 1672 DORNER (JW), COLE (RJ), LOMAX (LG), GOSSER (HS) and DIENER (UL). Cyclopiazonic acid production by *Aspergillus flavus* and its effects on broiler chickens. *Appl. Environ. Microbiol.* 46(3); 1983; 698-703

TURKEY

- 1673 SKLAN (D), TENNE (Z) and BUDOWSKI (P). The effect of dietary fat and tocopherol on lipolysis and oxidation in Turkey meat stored at different temperatures. *Poult. Sci.* 62(10); 1983; 2017-21

EGG

- 1674 ANON. Why and how to weigh eggs. *Poult. Tribune.* 89(7); 1983; 28-31
- 1675 WOODWARD (SA), COTTERILL (OJ) and BAILEY (ME). Pinpointing egg flavour. *Poult. Tribune.* 89(4); 1983; 14

- 1676 COTTERILL (OJ). Unscrambling frozen egg mixes. *Poult. Tribune.* 89(6); 1983; 10,12,14
- 1677 PIKE (OA) and HUBER (CS). Effect of formulation on water activity and sensory attributes of egg sausage. *Poult. Sci.* 62(10); 1983; 2004-10
- The effect was investigated of sodium chloride (1.5, 3.0, 4.5%), hydrolysed plant protein (2.0, 3.0, and 4.0%) and whey (2.0, 3.0, 4.0%) on the water activity of egg sausages containing approximately 44% whole egg, 24% pork fat and 18% mechanically deboned sprout fowl meal. Both sodium chloride and hydrolysed plant protein significantly lowered water activity, whereas whey did not do so. KAR

SEAFOODS

FISH

- 1678 GALL (KL), OTWELL (WS), KOBURGER (JA) and APPLIEDORF (H). Effects of four cooking methods on the proximate, mineral and fatty acid composition of fish fillets. *J. Food Sci.* 48(4); 1983; 1068-74
- 1679 GRONINGER (H), HAWKES (JW) and BABBITT (JK). Functional and morphological changes in processed frozen fish muscle. *J. Food Sci.* 48(4); 1983; 1388-90
- 1680 ROCKOWER (RK), DENG (JC), OTWELL (WS) and CORNELL (JA). Effect of soy flour, soy protein concentrate and sodium alginate on the textural attributes of minced fish patties. *J. Food Sci.* 48(4); 1983; 1048-52
- A mixture response statistical design was used to investigate the textural attributes of minced fish patties. Patties formulated with pollock were significantly firmer than those made from turbot and pollock blends or from turbot alone. Breakpoint values and firmness scores were negatively correlated with flavour and acceptability scores indicating that as patty firmness increased general acceptability declined. Higher acceptability for softer patties formulated with more turbot were attributable to the higher fat content. Increasing the soy protein levels and decreasing alginate content increased patty firmness regardless of fish composition. The patty formulation with maximum predicted acceptability was 78% turbot, 11% soy flour, and 11% soy protein concentrate. AA
- 1681 MALLE (P), NOWOGROCKI (G) and TAILLIEZ (R). Relationship between the deterioration index and rates of total volatile basic nitrogen for marine fish. *Sci. Aliment.* 3(2); 1983; 311-22 (French)
- The relationship between deterioration index and rates of total volatile basic nitrogen (TVBN) was studied in four species of marine fishes (flounder, mackerel, herring, and cod), and found to be $y = \frac{ax}{b-x} + cx + d$ where y and x are TVBN and deterioration index respectively. Statistical analysis of the experimental data showed a non-linear correlation between the studied parameters. The relations can be used for flounder, mackerel, and herring, but there is some scattering of the TVBN values for each index. The latter is due to intervention of some external parameters which have been examined to enable utilization of this method in practice. KMD

- 1682 LUCKAS (B) and MONTAG (A). A method for differentiated mercury determination in sea animals. *Dtsch. Lebensmittel Rundschau* 79(4); 1983; 111-7
Inorganically bound Hg in sea animals is determined by AAS, after reduction with ascorbic acid; organically bound Hg is determined similarly, after reduction with $\text{SnCl}_2/\text{CdCl}_2$ solution. This method makes it possible to trace and keep a record of quantitative losses of Hg during processing. One can obtain a very precise idea of all the Hg compounds, even in sea animals have a very high proportion of organic Hg. KMD
- 1683 JOSEPHSON (DB), LINDSAY (RC) and STUIBER (DA). Bisulphite suppression of fish aromas. *J. Food Sci.* 48(4); 1983; 1064-7
- 1684 RICHTER (ER) and BANWART (GJ). Microbiological and sensory evaluation of fresh fish packaged in carbon dioxide for retail outlets in the Midwest. *J. Food Prot.* 46(3); 1983; 245-7
Fish packaged in the nylon-surlyn bags and back flushed with approximately 80% CO_2 and stored at 1 C developed very small number of microflora (1) as compared to those without CO_2 (2) or those overwrapped with polyvinylchloride film (3). Bacterial lag phase increase was observed in (1) as compared to (2) or (3). (1) also maintained a lower pH than (2) or (3). BSN
- 1685 MABESA (RC), CASTILLO (MM), REVILLA (SV) and BANDIAN (VT). Safety evaluation of fermented fish and shellfish products I. Microbiological contaminants. *Philippine J. Sci.* 112(1-2); 1983; 91-102
Total plate counts and specific tests for indicator organisms were performed on fermented fish and shellfish samples collected from different regions of the Philippines from December, 1980 to December, 1981. Microorganisms of public health significance detected and enumerated were the fecal coliforms, staphylococci, salmonellae and vibrios. Results revealed that coliforms predominated in many of the samples analyzed, staphylococci occurred moderately while salmonellae and vibrios were only occasionally detected. Samples from the Bicol and Visayas regions were grossly contaminated while those from Northern Luzon were less contaminated. AA
- 1686 MABESA (RC), CASTILLO (MM) and BANDIAN (VT). Safety evaluation of fermented fish and shellfish product II. Physical contaminants. *Philippine J. Sci.* 112(1-2); 1983; 103-8
Fermented fish and shellfish products collected from different regions of the Philippines from December, 1980 to December, 1981 were analyzed microscopically for physical contaminants. The most common items found were seaweed parts and stones. Insect parts and leaf stems ranked next while wood scraps and hair were occasionally detected. AA

ROCKFISH

- 1687 ADU (GA), BABBITT (JK) and CRAWFORD (DL). Effect of washing on the nutritional and quality characteristics of dried minced rockfish flesh. *J. Food Sci.* 48(4); 1983; 1053-5, 1060

SHELLFISH

- 1688 SULLIVAN (JJ), SIMON (MG) and IWAOKA (WT). Comparison of HPLC and mouse bioassay methods for determining PSP toxins in shellfish. *J. Food Sci.* 48(4); 1983; 1312-14

Paralytic shellfish poisoning (PSP) toxins in shellfish were analyzed and quantified using both a high pressure liquid chromatographic (HPLC) technique and the standard AOAC mouse bioassay. Good correlation between the two assays was obtained at or below the limit of 80 µg toxin/100 g, while at higher levels of toxicity, the HPLC technique tended to underestimate total toxicity slightly. Advantages and disadvantages of both techniques are discussed. AA

SHRIMP

- 1689 NIELSEN (LA), PRICE (RJ) and CARROAD (PA). Water re-use in processing of pacific shrimp. *J. Food Sci.* 48(4); 1983; 1056-60

SQUID

- 1690 MORAL (A), TEJADA (M) and BORDERIAS (AJ). Frozen storage behaviour of squid (*Loligo vulgaris*). *Int. J. Refr.* 6(1); 1983; 54-7

Samples of squid were subjected to five different methods of preparation and were then kept at -20 C for 408 days. The texture, as measured by sensory, instrumental and chemical methods, was maintained for all samples and no rancid flavour or odour was found. No melanosis was detected, but if thawed material was held at a chill temperature for three days melanosis then appeared in all batches which were not skinned. AA

PROTEIN FOODS

Nil

FRUIT JUICES AND BEVERAGES

- 1691 ANON. Drinks industry hazards. *Int. Bottler Pack.* 57(2); 1983; 32
- 1692 ANON. Beverage can filling and packing. *Int. Bottler Pack.* 57(7); 1983; 12-14,16,18,20,22
- 1693 GIOVANNI (ME) and PANGBORN (RM). Measurement of taste intensity and degree of liking of beverages by graphic scales and magnitude estimation. *J. Food Sci.* 48(4); 1983; 1175-82

Graphic scaling (GS) and magnitude estimation (ME) of hedonic and intensity responses to 4-30% sucrose in lemonade and 0-16% fat in milk gave similar conclusions about the beverages, but GS was simpler to perform and responses were influenced less by numerical and contextural effects. More restricted ranges were used for ME than for GS, and for hedonic than for

intensity responses. Good reproducibility was obtained, except for GS of hedonic responses to lemonade, which were bimodally distributed. Use of a higher sucrose reference (R) in lemonade decreased ME values, and increased the intensity exponent from 0.651 when R was 4% sucrose to 0.973 when R was 10% sucrose. Individual intensity exponents varied from 0.068-0.372 for milk, and from 0.146-1.075 for lemonade when R was 4% sucrose, and from 0.373-2.635 when R was 10% sucrose. AA

SOFT DRINK

- 1694 FUKUOKA. Great success in development of a new composite can for soft drinks. *Packag. Jpn.* 4(15); 1983; 29-32

FRUIT JUICES

- 1695 ANON. The fruit juice trade - an expanding business for developing countries. *Profudcil Bull.* 17(4); 1983; 3-9

The developing countries are major suppliers of fruit juices accounting for about 54% of the total world export value in 1981. The world market for these fruit juices has been surveyed, and 25 top importing countries identified. Wide range of fruit juices supplied by the developing countries and the market conditions in terms of consumer preference, packaging and quality vary widely among the countries, making it necessary for the exporting country to select its target country with utmost care. MVG

CITRUS JUICE

- 1696 LIFSHITZ (A). Methods to detect adulteration of citrus juice as experienced in Israel. *Food Technol. Aust.* 35(7); 1983; 336-8

Samples were analysed for concentration of nine parameters and the maximum and minimum values were compiled for each parameter. The ratio between sugar content and Brix were found to be very efficient to detect additions of sugar to citrus juice. Determination of free amino acids in the juice is the most accepted method. The high cost of these amino acids make the juice adulteration not economically feasible. KAR

ORANGE JUICE

- 1697 CHANDLER (BV). Polyphenolic content and orange juice authenticity. *Food Technol. Aust.* 35(10); 1983; 448-9

Because its determination is easy, rapid and cheap, the so-called polyphenolic content of orange juice as measured by spectrophotometry is frequently used in Australia as an indicator of juice content. Reasons are given why the polyphenolic content cannot be considered a valid criterion for authenticity of commercial orange juices in Australia. AA

KIWIFRUIT JUICE

- 1698 WILSON (EL) and BURNS (DJW). Kiwifruit juice process using heat treatment techniques and ultrafiltration. *J. Food Sci.* 48(4); 1983; 1101-105

Heat treatment of kiwifruit juice caused formation of a heavy protein precipitate. Celite filtration removed the precipitate giving a clear, heat-stable juice which could be readily concentrated and reconstituted. Hollow fibre ultrafiltration was used to clarify and nonthermally sterilize kiwifruit juice. Virtually all the soluble proteolytic enzyme, actinidin, remained in the retentate although there was some loss of enzymatic activity. Some sedimentation was observed in both conventionally prepared and ultrafiltered juices prepared in the 1980 season, but not in 1981. A procyanidin: protein haze formed immediately in certain clarified kiwifruit juice: apple juice blends. AA

TEA

- 1699 FERNANDO (V) and ROBERTS (GR). The effect of process parameters on seasonal development of flavour in black tea. *J. Sci. Food Agric.* 35(1); 1984; 71-6

GLC of ether extractable steam volatiles of black tea from a Sri Lankan high altitude tea estate showed the presence of trans-2-hexenal, *n*-butyraldehyde, *cis*-3-hexenol, 1-octen-3-ol linalool, methyl salicylate, and geraniol. Seasonal changes were noted in trans-2-hexenal and linalool. The formation of these two constituents was also influenced by withering and fermentation of tea leaves. JVS

- 1700 TAKEO (T). Effect of the withering process on volatile compound formation during black tea manufacture. *J. Sci. Food Agric.* 35(1); 1984; 84-7

The quantities of Z-3-hexenal ester, linalool and its oxides and methylsalicylate were much higher in withered teas than in nonwithered tea. The E-2-hexenal content was greater in non-withered tea. JVS

- 1701 TSUSHIDA (T) and TAKEO (T). Ethylamine content of fresh tea shoots and made tea determined by high performance liquid chromatography. *J. Sci. Food Agric.* 35(1); 1984; 77-83

It has been demonstrated recently that *O*-phthalaldehyde/2-mercaptoethanol reagent is suitable for precolumn derivation of amines. Fluorescence detection coupled with HPLC was found to be specific and sensitive for the estimation of biogenic amines in nanogram quantities. By using this method, ethylamine content of tea shoots declined during growth and senescence after plucking. It also decreased in fresh tea extracts incubated at 37 C; the decrease was inhibited by amine oxidase inhibitors. The mean ethylamine contents of 22 green teas and 17 black teas were $6.75 \pm 3.07 \mu\text{mol g}^{-1}$ and $6.4 \pm 1.82 \mu\text{mol g}^{-1}$ respectively. JVS

COFFEE

- 1702 BUCHANAN (RL), HARRY (MA) and GEALT (MA). Caffeine inhibition of sterigmatocystin, citrinin, and patulin production. *J. Food Sci.* 48(4); 1983; 1226-8

Microbiological medium was used to study the effect of caffeine on sterigmatocystin, citrinin, and patulin production by *Aspergillus versicolour*, *Penicillium citrinum*, and *Penicillium urticae*, respectively. Caffeine inhibited the growth of the three fungal species and decreased sterigmatocystin and patulin production. The effect on citrinin production appeared to be

limited to a delay in toxin synthesis. A preliminary examination of *P. urticae* suggested that caffeine's anti-mycotoxigenic activity does not involve a generalized inhibition of lipid synthesis. AA

- 1703 SUZUKI (T) and WALLER (GR). Biodegradation of caffeine: Formation of theophylline and theobromine from caffeine in mature *Coffea arabica* fruits. *J. Sci. Food Agric.* 37(1); 1984; 66-70

The mode of synthesis of theophylline, theobromine and caffeine during the growth stages of *Coffea arabica* bean has been presented. Theophylline was found to arise from caffeine breakdown in excised coffee berries. The level of theophylline in mature and ripened fruit was 20-50 times that in mature green fruit. Theophylline was associated with caffeine biodegradation while theobromine was involved in biosynthesis as well as biodegradation of caffeine. JVS

WINE

- 1704 SCIANCALEPORE (V), DE GIGLIO (A) and PALLAVICINI (C). Determination of some constituents of wine lees. *Ind. Aliment. Agric.* 100(6); 1983; 365-7 (French)

Analysis of wine lees revealed the presence of various amino acids - mainly those already reported in the literature - certain interesting aliphatic acids (e.g. capric, lauric, myristic) in addition to palmitic, stearic, oleic, linoleic, and linolenic which account for nearly 93% of the fatty acids, and certain oligoelements. KMD

- 1705 NOBLE (AC), WILLIAMS (AA) and LANGRON (SP). Descriptive analysis and quality ratings of 1976 wines from four Bordeaux communes. *J. Sci. Food Agric.* 35(1); 1984; 88-98

Twenty-four wines from four communes in Bordeaux were evaluated by descriptive analysis by trained assessors. The same 1976 wines were assigned quality ratings by Masters of Wine (MW). The major aroma difference between the wines was attributed to variation in the intensity of the 'green bean/green olive' character by canonical variates analysis (CVA) of the aroma descriptor ratings across wines. The CVA of the flavour by mouth ratings showed the wines to be discriminated primarily on the basis of astringency and bitterness. By multivariate analysis of variance across regions, and by examination of the configurations derived from the CVA across wines, it was shown that the wines did not vary significantly between communes. No significant difference between the wines in quality ratings of the MWs was found. AA

- 1706 ASSELIN (C), MORLAT (R), LEON (H), ROBICHET (J), REMOUE (M) and SALETTE (J). Method of sensory analysis adopted to a better characterization of red wines from various viticultural soil condition. *Sci. Aliment.* 3(2); 1983; 245-63 (French)

A wine score card enables wine tasters to analyse accurately the organoleptic criteria of each sample and the determination of sensorial profiles. The introduction of check sample wines and the creation of their average profiles make it possible to give a classification, then to make a choice among the tasters. The different criteria are submitted to variance analysis. After Duncan's test has been carried out, the significant criteria make it possible to differentiate wines. Using descriptive statistics, a table is drawn up giving the frequency of aromas and the aromatic intensity of each wine. AA

- 1707 LEFEBVRE (A), RIBOULET (J-M), BOIDRON (JN) and RIBEREAU-GAYON (P). The incidence of micro-organisms on cork, and their effect on the olfactive alterations of wine. *Sci. Aliment.* 3(2); 1983; 265-78 (French)

Micro-organisms are present on cork from the original cork tree to the final cork stopper. They can degrade some of the cork constituents and form volatile metabolites that are responsible for the "corky" flavour of wines. The organisms giving rise to this phenomenon belong to the genera: *Streptomyces*, *Aspergillus*, and *Penicillium*. Corky flavour may also be developed by the action of these micro-organisms on materials other than cork, e.g., on mouldy grapes, and on wooden barrels, or containers. The substances responsible for these strange odours are present in very low-concentrations. Guaiacol has been identified as one such substance, and it is formed from vanillin and vanillic acid. Chloroanisoles, which may sometimes affect the aroma of wine, were not identified in this study. KMD

- 1708 HEIMANN (W), RAPP (A), VOLTER (I) and KNIPSER (W). A contribution to the phenomenon of the corky tinge in wine. *Dtsch. Lebensmittel-Rundschau.* 79(4); 1983; 103-7 (German)

Results obtained show that the mould fungus isolated out of cork (*Penicillium roquefortii*) produces a cork-like must tinge both on corkwood and on corkwood-holding culture media. Gas chromatographic analysis, together with "snooping" revealed that this mis-tinge is brought about by several components. By means of mass spectrometry, therefore identified for the first time as sesquiterpenes. AA

CASHEW APPLE BEVERAGE

- 1709 BOPAIAH (BM). Alcoholic beverages from cashew apple. *Peanut J. Nut. World.* 57(4); 1983; 23-4

OILS AND FATS

- 1710 BOYER (MJ). Current pollution control practices in the United States. *J. Am. Oil Chem. Soc.* 61(2); 1984; 297-301

Discusses: enzyme reactions in organic solvents; feed stock variation; temperature and monoester unsaturation; and observations. BSN

- 1711 FRIEDRICH (JP) and PRYDE (EH). Supercritical CO₂ extraction of lipid-bearing materials and characterization of the products. *J. Am. Oil Chem. Soc.* 61(2); 1984; 223-8

- 1712 HOUSE (JE). The chemistry and applications of amine derivatives in solvent extractions. *J. Am. Oil Chem. Soc.* 61(2); 1984; 357-362

Discusses: historical observations; description of the solvent extraction (Sx) process; properties of an extractant; ion-pair extractants; chelation agents; neutral or solvating type; acid extractants; and disadvantages of Sx process. BSN

- 1713 MIN (DB) and WEN (J). Qualitative and quantitative effects of antioxidants on the flavour stability of oil. *J. Food Sci.* 48(4); 1983; 1172-4, 1182
Qualitative and quantitative effects of the common antioxidants, BHA, BHT, PG and TBHQ on the rate of dissolved free oxygen disappearance in

soyabean oil during storage were studied. The order of effectiveness was BHA, BHT, PG and TBHQ with TBHQ as the most effective. Statistical analyses of the results showed that the effects of BHA and BHT were not significantly different from each other at the 5% level, but BHA or BHT was different from PG or TBHQ, and PG was different from TBHQ. The antioxidant effectiveness of levels of 0, 50, 100, 150 and 200 ppm BHA, BHT, PG or TBHQ was significantly different from one another at the 5% level. The higher the amounts of antioxidants added, the slower the rate of dissolved oxygen disappearance in the oil. AA

- 1714 LAWRENCE (BM). Progress in essential oils. *Perfum. Flavor.* 8(6); 1983/1984; 69-79

The aspects cover recent literature review on clove and dill oil. BSN

- 1715 DUPLESSIS (LM) and PRETORIUS (HE). Phospholipid composition of some plant oils at different stages of refining, measured by the latroscanchromarol method. *J. Am. Oil Chem. Soc.* 60(7); 1983; 1261-5

- 1716 BADAMI (RC) and ALAGAWADI (KR). Minor seed oils XVIII: Physico-chemical characteristics and component acids of eight seed oils. *Fette Seifen Anstrichm.* 85(5); 1983; 197-8

Seed oils from *Androgaphis paniculata*, *Caliopsis elegans*, *Corochorus trilocularis*, *Crotalaria heyneana*, *Embllica officinalis*, *Mangifera indica*, *Pergularia daemia* and *Sopubia dulphinifolia* have been examined. Of these, the seeds from *Androgaphis paniculata*, a shrub, *Embllica officinalis*, a tree, and *Mangifera indica*, a tree, contain 39.4, 22.4 and 12.0 percent of oil respectively. *Pergularia daemia* is rich in stearic acid (37.4%). *Crotalaria heyneana*, *Androgaphis paniculata* and *Caliopsis elegans* seed oils are rich in linoleic acid (60.5%, 58.9% and 48.3%) respectively, while seed oils from *Corochorus trilocularis* and *Embllica officinalis* contain linolenic acid (3.6% and 5.9%). Seed oils of *Pergularia daemia*, *Corochorus trilocularis* and *Embllica officinalis* having iodine value from 63 to 85 may be useful as nondrying oils. AA

GROUNDNUT OIL

- 1717 RIGLER (MW), ROTH (IL), KRITCHEVSKY (D) and PATTON (JS). The freeze fracture ultrastructure of peanut oil and other natural and synthetic triacylglycerol droplets. *J. Am. Oil Chem. Soc.* 60(7); 1983; 1291-8

OLIVE OIL

- 1718 KIRITSAKIS (AK), STINE (CM) and DUGAN (LR) Jr. Effect of selected antioxidants on the stability of virginolive oil. *J. Am. Oil Chem. Soc.* 60(7); 1983; 1286-90

PALM OIL

- 1719 De VRIES (RJ). Utilization of Malayasian palm oil and palm kernel oil for fatty acids and derivatives. *J. Am. Oil Chem. Soc.* 61(2); 1984; 404-7

- 1720 NG (S) and NG (WL). B_C NMR spectroscopic analysis of the fatty acid composition of palm oil. *J. Am. Oil Chem. Soc.* 60(7); 1983; 1266-8

SESAME SEED OIL

- 1721 TYAGI (P) and VASISHTHA (AK). Component fatty acids and glycerides of oils from different genetic varieties of *Sesamum indicum*. *J. Oil Technol. Assoc. India.* 15(2); 1983; 29-32

The physico-chemical characteristics, fatty acid composition, and the triglyceride composition of oil from the seeds of 15 different sesamum varieties have been reported. A table giving the fatty acid groups present in the triglycerides of the different sesamum varieties has been included. KMD

SOYABEAN OIL

- 1722 BAKER (EC) and SULLIVAN (DA). Development of a pilot-plant process for the extraction of soy flakes with aqueous isopropyl alcohol. *J. Am. Oil Chem. Soc.* 60(7); 1983; 1271-7

- 1723 MOULTON (KJ) Sr., KORITALA (S) and FRANKEL (EN). Ultrasonic hydrogenation of soyabean oil. *J. Am. Oil Chem. Soc.* 60(7); 1983; 1257-8

The rate of hydrogenation of soyabean oil with either copper chromite or nickel catalysts increased more than a hundredfold with the aid of ultrasonication. In a continuous reaction system, the selectivity with copper catalyst for linolenate reduction was somewhat lower when ultrasonic energy was applied than when not applied. With ultrasonic energy, 87% hydrogenation of linolenate in soyabean oil was obtained in 9 seconds at 115 psig H_2 with 1% copper chromite at 181 C and 77% linolenate hydrogenation with 0.025% nickel. Without ultrasonic energy, only 59% linolenate hydrogenation was obtained in 240 seconds with copper chromite at 198 C and 500 psig H_2 and 68% linolenate hydrogenation in 480 seconds with nickel at 200 C and 115 psig H_2 . This innovation may offer an important advantage in increasing the activity of commercial catalysts, particularly copper chromite, for fats and oil hydrogenation. AA

- 1724 CHEN (AH), McINTIRE (DD), GIBSON (P) and COVEY (JE). Investigation and modeling of mass transfer in soyabean oil hydrogenators. *J. Am. Oil Chem. Soc.* 60(7); 1983; 1326-30

- 1725 YAO (JJ), WEI (LS) and STEINBERG (MP). Effect of maturity on chemical composition and storage stability of soyabeans. *J. Am. Oil Chem. Soc.* 60(7); 1983; 1245-9

Soyabeans at different stages of maturation were tested for their chemical composition and storage stability. The level of trypsin inhibitor activity remained the same at all maturation stages, while lipoxxygenase activity and phytate content were significantly lower in immature beans. Crude oil and protein contents were similar, at all maturation stages. During storage, lipoxxygenase activity decreased independently of maturation, but free fatty acid in the crude oil increased at a faster rate in immature beans than in the oil from mature beans. KMD

- 1726 RAIE (MY) and LATIF IGBAL (M). Chromatographic studies of soyabean oils. *Fette Seifen Anstrichm.* 85(5); 1983; 194-5 (German)

Six varieties of soyabean cultivated in Pakistan have been studied. These contain 15.9-20.1% oil and their fatty acid composition as determined by GLC is myristic (0.2-0.4%), palmitic (11.7-13.9%), stearic (1.2-5.4%), oleic (21.2-31.8%), linoleic (41.2-53.4%), linolenic (5.1-9.2%), arachidic (0.2-0.6%), behenic (0.2-0.6%) and lignoceric (0.3-0.5%). AA

- 1727 STONE (R) and HAMMOND (EG). An emulsion method for the sensory evaluation of edible oils. *J. Am. Oil Chem. Soc.* 60(7); 1983; 1277-81

The flavour intensity of soyabean oils was evaluated in emulsions stabilized with gum acacia. A 10-point scale was used with a blank to establish the bland end of the scale and a standard diacetyl solution to establish a point near midscale. Tasting oils in emulsion gave significantly different scores than tasting oil directly. Evaluation in emulsion decreased panel error for poor quality oils but not for very bland oils. At least six samples could be tasted in emulsion without causing panel fatigue or reducing accuracy. The concentration of oil in the emulsion could be adjusted to increase sensitivity to weak flavours or improve the evaluation of intensely flavoured oils. Soyabean oils containing various amounts of linolenic acid were evaluated by the emulsion method, and those with lesser amounts of linolenic acid were shown to be more stable. A gas chromatographic total volatile method, was shown to correlate fairly well with sensory evaluation of oils tasted in emulsions under conditions where both flavours scores and total volatiles changed significantly with time. AA

TAMARIND KERNEL OIL

- 1728 ANDRIAMANATENA (RW), ARTAUD (J), GAYDOU (EM), IATRIDES (MC) and CHEVALIER (JL). Fatty acid and sterol compositions of Malagasy tamarind kernel oils. *J. Am. Oil Chem. Soc.* 60(7); 1983; 1318-21

The oil contents of six samples of Malagasy tamarind (*Tamarindus indica* L.) kernel were determined by hexane extraction (6.0-6.4%) and chloroform/methanol extraction (7.4-9.0%). The protein contents were very low (trace-0.1%). Investigation by gas liquid chromatography revealed 15 fatty acids, mainly palmitic (14-20%), stearic (6-7%), oleic (15-27%), linoleic (36-49%), arachidic (2-4%), behenic (3-5%) and lignoceric (3-8%) acids. Testing for the sterol fraction enabled seven sterols to be separated and quantitatively analyzed by gas liquid chromatography. The main sterols were β -sitosterol (66-72%), campesterol (16-19%) and stigmasterol (11-14%). AA

FATS

- 1729 HAGEMANN (JW) and ROTHFUS (JA). Computer modeling of theoretical structures of monoacid triglyceride α -forms in various subcell arrangements. *J. Am. Oil Chem. Soc.* 60(7); 1983; 1308-14

- 1730 ALEXANDER (JC), CHANIN (BE) and MORAN (ET). Nutritional effects of fresh, laboratory heated, and pressure deep fry fats. *J. Food Sci.* 48(4); 1983; 1289-92, 1299

Cooking fats from a pressure deep-fat frying operation producing fried chicken, were compared with laboratory heated and fresh fats in the diets of animals. Included were corn oil (CO), peanut oil (PO), and partially hydrogenated soyabean oil (HSBO). Weanling rats were fed diets containing 15% fat for 28 days. Laboratory heating reduced absorption of CO and PO,

but not that of HSB0. Pressure deep-frying increased absorption of HSB0. Animals derived less metabolizable energy from diets containing heated or hydrogenated fats relative to fresh oil. Polar lipid fractions of liver changed due to heating. Pressure deep-frying with fats resulted in less deterioration than with laboratory heating, as shown by chemical analysis, coefficient of digestibility, and metabolizable energy studies. AA

- 1731 MURALIDHARA (HG). Uncommon edible fats of Uttar Pradesh. *Khadigramodyog*. 29(5); 1983; 209-11
- 1732 ARENS (M) and DIETSCHE (W). Survey by a working party of the DGE, analysis of waxes and wax products XII. *Fette Seifen Anstrichm.* 85(5); 1983; 196-7 (German)
- 1733 SONNTAG (NOV). New developments in the fatty acid industry in America. *J. Am. Oil Chem. Soc.* 61(2); 1984; 229-32
Discusses: new raw materials; slow and continuing replacement of fatty acids by methyl esters; developments in high heat-dependent oleochemical reactions; conventional physical separation unit operations; oleo-chemical reactions; and biotechnology. BSN
- 1734 STAGE (H). Fatty acid fractionation by column distillation: Purity, energy consumption and operating conditions. *J. Am. Oil Chem. Soc.* 61(2); 1984; 204-214
Discusses: fatty acid fractionation in the past; basis for a new fractionation process; raw materials for fatty acid fraction; separation conditions for different raw acids in relation to temperature, residence time and fatty acid constitution; conditions and installations for effective as well as sensitive evaporation and condensation; new column construction of low pressure drop achieving high efficiencies; and process possibilities. BSN
- 1735 HARALDSSON (G). Separation of saturated/unsaturated fatty acids. *J. Am. Oil Chem. Soc.* 61(2); 1984; 219-22
Discusses: principles; preparation of raw material; and separation methods - mechanical pressing, hydrophilization process, fractional crystallization from solvents. BSN
- 1736 PLATTNER (RD), GARDNER (HW) and KLEIMAN (R). Chemical ionization mass spectrometry of fatty acids. The effect of functional groups on the CI spectra. *J. Am. Oil Chem. Soc.* 60(7); 1983; 1298-303
Chemical ionization (CI) mass spectra of functionally substituted fatty esters are a useful aid in determining molecular weight. Isobutane and ammonia CI mass spectra of various hydroxy, keto, epoxy and hydroperoxy fatty esters are reported and discussed. AA
- 1737 SHAH (SG), SUBRAHMANYAM (VVR) and REGE (DV). Composition and characteristics of four, non-traditional, indigenous hard fats. *J. Oil Technol. Assoc. India.* 15(2); 1983; 19-22
Hexane was used to extract fat from 8 samples of arecanut, 5 samples of mango kernels and one sample each of "phulwara" (*Madhuca butyraceae*) and "pisa" (*Actinodaphne hookeri*); the chemical characteristics and fatty acid compositions of these fats have been reported. Arecanut fat was rich in lauric acid, mango kernel fat rich in myristic acid, phulwara kernel fat

rich in palmitic acid, and pisa kernel fat rich in stearic acid. The glyceride structure of the four fats has also been determined, using a rapid, argentation TLC-GLC technique. KMD

SPICES AND CONDIMENTS

- 1738 SHELEF (LA). Antimicrobial effects of spices. *J. Food Safety*. 6(1); 1984; 29-44

Discusses: microbial contamination in spices; *in vitro* antimicrobial effects of spices and spice extracts; *in vitro* antimicrobial activity of spice oils; antimicrobial activity of spices in foods; effect on bacterial spores; spices and other antimicrobials spices and thermal processing; spices and lactic acid bacteria; antimicrobial compounds in spices; and mode of action. BSN

- 1739 GERHARDT (U) and SCHROTER (A). Anti-oxidative effects of spices. *Gordian*. 83(9); 1983; 171-6 (German)

Several spices are known to have an anti-oxidative action on fats, the most noteworthy among them being rosemary, sage, oregano, clove, pimento and thyme. This effect is mainly due to the presence of phenolic compounds, among which the predominant ones are the flavonoids and phenol carbonic acids. Rosemaric acid appears to be the most useful compound in this respect. KMD

SAFFRON

- 1740 BASKER (D) and NEGBI (M). Uses of saffron. *Econ. Bot.* 37(2); 1983; 228-36

The use of saffron as medicine, as a dye, as a perfume, and use in food and the commercial trade are discussed. KAR

PAPRIKA

- 1741 COENEN (H) and HAGEN (R). Natural colouring substances from paprika by gas extraction. *Gordian*. 83(9); 1983; 164,166,168,170 (German)

The extraction of natural, colouring and aroma-producing substances from paprika using liquid CO₂ in a super-critical state has been described, and its advantages pointed out. Capsaicin, present in pungent varieties of paprika, is extracted along with the colouring compounds, and can be separated subsequently. Acetone-insoluble substances are not extracted along with the colours, so that the steps of washing with hot water and separation may be omitted. The extracted compounds can be easily separated by fractional crystallization from the gas. Energy consumption is very low in all steps of the process, and especially in the extraction which is done at 45 C. KMD

PEPPER

- 1742 ANON. Cleanliness specifications for unprocessed pepper as prescribed by American Spice Trade Association effective 1st January 1983. *Pepper News*. 6(12); 1983; 51-5

- 1743 JANSZ (ER), BALACHANDRAN (S), PACKIYASOTHY (EV) and RATNAYAKE (S). Effect of maturity on some chemical constituents of Sri Lankan pepper (*Piper nigrum* L.). *J. Sci. Food Agric.* 35(1); 1984; 41-6

Maturity was found to affect the essential oil and piperine contents; the oil composition remained mostly unaffected. Most of oil formation appeared to have occurred by 23rd week and piperine content reached the highest level namely 14.2% by 19 weeks. Starch synthesis dominated the latter half of development constituting 50% of dry matter on ripening. JVS

- 1744 KUZNIAR (A), BOWERS (JA) and CRAIG (J). Ascorbic acid and folic acid content and sensory characteristics of dehydrated green peppers. *J. Food Sci.* 48(4); 1983; 1246-9

Moisture content, water activity, ascorbic and folic acid content, and colour of blanched and unblanched green peppers, dried for 8 or 9 hours at 60 C or 12 hours at 49 C, were determined before and after 8 weeks storage at room temperature. Sensory characteristics of the peppers were evaluated after storage. Blanching influenced ascorbic acid content, colour, firmness, and intensity of green pepper, sweet and bitter flavour. Time and temperature of drying influenced water activity and some texture attributes. AA

- 1745 KALIANNAN RAJU, RAVINDRAN (PN) and NAIR (MK). Quality evaluation of black pepper cultivars. *Indian Spices.* 20(1); 1983; 3-5

Percentages of volatile oil, oleoresin, piperine and starch in the berries of 29 cultivars of black pepper (*Piper nigrum* L.) are reported. The essential oil content for most varieties ranged from 3 to 5% v/w, oleoresin content between 9 and 11% w/w and piperine content between 3 and 5% w/w. Starch content of most cultivars ranged from 20 to 35% w/w. The data indicated a negative correlation between starch and piperine contents, which is significant at 5% level. Yields of oleoresin and piperine on a hectare basis were also calculated as an additional measure of quality standards. MVG

CINNAMON

- 1746 MISRA (N). New records of fungi from the bark of *Cinnamomum zeylanicum* Bl. in storage. *Sci. Cult.* 49(5); 1983; 133-5

Several fungi (19 nos.), majority of which were fungi Imperfecti were isolated from market samples of cinnamon stored during different seasons. Out of these, 16 were obtained both from sterilised and unsterilised bark, while *Aspergillus foetidus* and *Paecilomyces varioti* appeared only on unsterilised bark. The fungi isolated also differed in their appearance in different seasons. While three species, were common to all seasons, others were restricted to particular seasons. The predominant species of fungi was *Aspergillus* during all seasons. MVG

SENSORY EVALUATION

- 1747 TOLSTOGUZOV (VB) and BRAUDO (EE). Fabricated foodstuffs as multicomponent gels. *J. Texture Stud.* 14(3); 1983; 183-212

A discussion is made of the physico-chemical problems arising in the development of production methods for fabricated foodstuffs representing, as a rule, multicomponent gels. Attention is paid to the significance of irreversible phenomena during gelation. Consideration is given to the requirements for the gelling agents in the production of artificial foodstuffs. Examples are presented of the effect of fillers on gel properties. AA

- 1748 BARBOSA CANOVAS (GV) and PELEG (M). Flow parameters of selected commercial semi-liquid food products. *J. Texture Stud.* 14(3); 1983; 213-34

The rheological characteristics of samples of commercial apple sauce, baby food (banana and peach), mustard and ketchup were evaluated by two successive shearing cycles in a coaxial viscosimeter. It was found that generally, both the Herschel-Bulkley and the modified Casson equations were equally good mathematical representatives of the experimental flow curves, especially after the sample has already been sheared once. The original Casson equation was generally a lesser appropriate model especially for the first flow curve. Time and shear effects on the flow curve features, and on the magnitude of the yield stress, were also studied. The results showed that although all the effects were roughly on the same order of magnitude, they varied considerably between the different types of products and within the same products of different manufacturers.

- 1749 KIOSSEOGLU (VD) and SHERMAN (P). The rheological conditions associated with judgement of pourability and spreadability of salad dressings. *J. Texture Stud.* 14(3); 1983; 277-82

A panel of 25 students compared the pourability and spreadability of two commercial brand salad dressings (non-Newtonian) and a CMC-sugar solution (Newtonian). Correlation of their responses with viscometric data for the 3 samples indicated that the shear stress and shear rate associated with the sensory evaluation of these two properties are 190-430 dyne cm⁻² and 0.9-6.3 s⁻¹, and 190 dyne cm⁻² and <0.9 s⁻¹, respectively. AA

- 1750 KAZANTZIS (D) and LEE (CM). Effect of rheological interrelationships between starch gel and fat on the fat dispersion in farinaceous gel matrix. *J. Texture Stud.* 14(3); 1983; 303-13

- 1751 KOKINI (JL) and CUSSLER (EL). Predicting the texture of liquid and melting semi-solid foods. *J. Food Sci.* 48(4); 1983; 1221-5

Magnitude estimations of a variety of dairy foods show that sensory assessments scores of "creaminess" can be predicted from scores of "smoothness" and "thickness." The empirical equation found for these predictions is very close to that found earlier for model solutions. Assessments of "smoothness" can be related to instrumental measurements of contact friction. Assessments of "thickness" for melting foods are related to estimates of shear stresses in the mouth generated during the melting of foods. AA

- 1752 VICKERS (ZM). Magnitude estimation vs. category scaling of the hedonic quality of food sounds. *J. Food Sci.* 48(4); 1983; 1183-6

- 1753 PELEG (M). Some theoretical rheological characteristics of the mechanical signals in sensory evaluation of texture. *J. Food Sci.* 48(4); 1983; 1187-91

- 1754 Van Der HEIJDEN (A), BRUSSEL (LBP), HEIDEMA (J), KOSMEIJER (JG) and PEER (HG). Interrelationships among synergism, potentiation, enhancement and expanded perceived intensity vs. concentration. *J. Food Sci.* 48(4); 1983; 1192-9

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

- 1755 MKHIZE (JN). Susceptibility of *Tribolium confusum* Jacquelin duval to an insect growth regulator with juvenile hormone-like effects. *Insect. Sci. Applicat.* 4(4); 1983; 415-6
- 1756 GALLIS (D), DEFNER-HALLOWELL (A), WHITE (JC) and WABER (J). Optimization of a reversed phase partitioning technique for the analysis of polychlorinated biphenyls in aqueous samples by gas chromatography mass spectrometry. *Bull. Environ. Contam. Toxicol.* 31(3); 1983; 285-91

BIOCHEMISTRY AND NUTRITION

- 1757 KUMAR (V) and KAPOOR (AC). Availability of zinc as affected by phytate. *Nutr. Rep. Int.* 28(1); 1983; 103-11
- Phytate to zinc molar ratios of 32 samples of cereals and legumes varied from 11.4 to 38.6. The poor growth rate of rats and lower values of food efficiency ratio and protein efficiency ratio receiving natural synthetic diets containing higher phytate to zinc molar ratios were associated with significantly lower plasma and hair zinc concentrations. KAR
- 1758 ANON. Measures against a high salt content. *Gordian.* 83(9); 1983; 176-7 (German)
- 1759 MILLER (DS) and JUDD (PA). The metabolisable energy value of foods. *J. Sci. Food Agric.* 35(1); 1984; 111-6
- A new equation is proposed for the calculation of ME, taking into account the dietary fibre content of foods and its effects on the digestibility of proximate sources of energy. The equation has been tested against values for the ME of various diets determined by balance studies in human subjects, and gives results which agree within 3%. This agreement is much closer than that obtained with the other available methods for calculating ME, including those currently in use. AA
- 1760 EGGUM (BO), PEDERSEN (B) and JACOBSEN (I). The influence of dietary tea, coffee and cocoa on protein and energy utilization of soyabean meal and barley in rats. *Br. J. Nutr.* 50(2); 1983; 197-205
- Tea and coffee had significantly negative effect on the protein digestibility and biological value, while digestible energy was slightly affected only in the barley based diet. Cocoa had no effect on protein or energy utilization in either soyabean or barley diets. As the tannin concentration

in tea and coffee was very high, it is assumed that the observed deleterious effects might, in part, be explained by antinutritional effects of tannin. KAR

- 1761 ANTENER (I), VERWILGHEN (AM), VAN GEERT (C) and MAURON (J). Biochemical study of malnutrition. Part VI. Histidine and its metabolites. *Int. J. Vitaminol. Nutr. Res.* 53(2); 1983; 199-209
- 1762 DUNCAN (A), ELLINGER (GM) and GLENNIE (RT). Determination of unmodified methionine and methionine sulfoxide in food proteins by gas-liquid chromatography. *J.Sci. Food Agric.* 35(1); 1984; 117-20
GLC determination of methionine in foods is carried out after reaction with CN Br and methionine sulfoxide levels measured in terms of increase in methionine after reduction with titanium chloride. The values for total methionine after reduction with titanium chloride and reaction with CN Br closely resembled those obtained by ion-exchange chromatography after oxidation with performic acid. A table provides data on the methionine content of 12 different proteins (casein, pilchard meal, blood meal, soya-bean meal, hydrocarbon yeast and milk powder). JVS
- 1763 COSSACK (ZT) and WEBER (CW). A proposed bioassay for the evaluation of protein quality using mice. *Nutr. Rep. Int.* 28(1); 1983; 203-18
The use of rat vs. the mouse for the evaluation of protein quality was done by feeding weanling rats and mice with protein from six different sources and by determining the protein efficiency ratio, net protein ratio, relative protein value, and protein digestion. It is concluded that mouse appears to be a suitable animal model to use in the evaluation of protein quality over rat bioassay. KAR
- 1764 GREGORY (JF) III and HINER (ME). Thermal stability of vitamin B₆ compounds in liquid model food systems. *J. Food Sci.* 48(4); 1983; 1323-7, 1339
The degradation of pyridoxine (PN), pyridoxal (PL), and pyridoxamine (PM) during thermal processing was evaluated in casein-based liquid model food systems. Limited evaluation of various potentially reactive ingredients suggested that vitamin B₆ stability is not strongly a function of food system composition. Rapid interconversion of PL and PM was observed. Kinetic analysis of B₆ vitamin degradation revealed approximately 2.5- to 3.5-fold greater stability of PN than the other nonphosphorylated vitamins, with activation energies of 27.3, 23.7, and 20.8 kcal/mol for the loss of total vitamin B₆ after initial fortification with PN, PM, and PL, respectively. Limited studies with pyridoxal 5'-phosphate indicated that it is approximately 4.5- to 2-fold less stable than PL. AA
- 1765 LEINERT (J), SIMON (I) and HOTZEL (D). Methods and their evaluation to estimate the vitamin B₆ status in human subjects. V. S-PLP-determination. Method and comparison of methods. *Int. J. Vitaminol. Nutr. Res.* 53(2); 1983; 156-65 (German)
A method to determine the plasma pyridoxal-5-phosphate (PLP) based on the enzymatic decarboxylation of 1-¹⁴C-L-tyrosine and the measurement of radioactive ¹⁴CO₂ has been described and its efficiency and advantages described as compared to other methods. BSN
- 1766 HASSELMANN (C) and DIOP (PA). Determination of L-ascorbic acid in foods: A review. (1976-1981). *Sci. Aliment.* 3(2); 1983; 161-80 (French)

Publications during the period 1976-81 dealing with the estimation of L-ascorbic acid in foods have been reviewed. The methods employed are very diverse in nature: titrimetry, photometry, fluorometry, polarography, amperometry, isotachopheresis, thin-layer chromatography, gas-phase chromatography, and high-performance, liquid-phase chromatography. The advantages and disadvantages of these various techniques have been analyzed. HPLC has developed considerably during the last two years of this period, and special attention has been bestowed upon it. KMD

TOXICOLOGY AND HYGIENE

- 1767 WOOD (LV), FERGUSON (LE), HOGAN (P), THURMAN (D), MORGAN (DR), DUPONT (HL) and ERICSSON (CD). Incidence of bacterial enteropathogens in foods from Mexico. *Appl. Environ. Microbiol.* 46(2); 1983; 328-32
- 1768 WEISS (KF), CHOPRA (N), STOTLAND (P), RIEDEL (GW) and MALCOLM (S). Recovery of fecal coliforms and of *Escherichia coli* at 44.5, 45.0 and 45.5 C. *J. Food Prot.* 46(3); 1983; 172-7
- 1769 AULISIO (CCG), STANFIELD (JT), WEAGANT (SD) and HILL (WE). Yersiniosis associated with tofu consumption: Serological, biochemical and pathogenicity studies of *Yersinia enterocolitica* isolates. *J. Food Prot.* 46(3); 1983; 226-30, 234
- 1770 CLIVER (DO), ELLENDER (RD) and SOBSEY (MD). Methods for detecting viruses in foods: Background and general principles. *J. Food Prot.* 46(3); 1983; 248-59
Discusses: foods as vehicles for human viruses; significance of transmission through foods; detection in foods; test for viral contamination in fruits and vegetables, animal products; sample processing, concentration of sample extracts, testing in all cultures, controls; equipment for processing food samples; liquefaction; clarification; concentration; production of cell cultures; media and ingredients; apparatus; virus detection and characterisation. BSN
- 1771 LABUZA (TP). Regulation of mycotoxins in food. *J. Food Prot.* 46(3); 1983; 260-65
Discusses: law with respect to mycotoxins; setting up tolerances for regulation; exemptions to tolerance; regulatory history of aflatoxin; count actions on aflatoxin; and regulation of other mycotoxins. BSN
- 1772 OSTROWSKI-MEISSNER (HT). Effect of contamination of foods by *Aspergillus flavus* on the nutritive value of protein. *J. Sci. Food Agric.* 35(1); 1984 47-58
The effect of aflatoxin was measured on the protein quality of peanut meal (PNM) and fish meal (FM). Total protein efficiency, protein efficiency ratio, net protein utilisation, examination of the histopathology of the liver, ileal digestion of amino acids and plasma amino acid concentration were used as bioassays together with chemical score (CS), dye binding capacity (DBC), essential amino acid index (EAAI), and discriminant computerized PER (DC-PER) as chemical methods. In trial 1, aflatoxin-free PNM was compared with infected PNM at graded levels of toxin when fed to chickens and ducklings. In trial 2, various mixtures of PNM and FM at a

constant aflatoxin level ($280\mu\text{g kg}^{-1}$) were fed to compare the effects of aflatoxin on proteins of differing quality. Ducks were more sensitive to the toxin than chickens, as indicated by deterioration of protein quality, and the effects on growth and the histological appearance of the liver were magnified on diets of low quality (PNM), but not of high quality (FM). Contamination of PNM resulted in progressive increase in DBC and, to a lesser extent, in DC-PER, while EAAI and CS were not affected. The importance of these findings lies in the problems of mould contamination of animal feed-stuffs in humid, tropical conditions, which may affect the more sensitive animals, and may not be detected by chemical methods of measuring protein quality, nor by bioassay on chickens, if the levels of contamination are low. AA

- 1773 BAHK (J) and MARTH (EH). Growth and synthesis of aflatoxin by *Aspergillus parasiticus* in the presence of ginseng products. *J. Food Prot.* 46(3); 1983; 210-15

GENERAL

- 1774 ANON. 'Fingerprinting' technique tips off food processors about off-flavours in ingredients. *Quick Frozen Food*. 45(6); 1983; 44
- 1775 LINDEMANN (Chr) and MULLER (G). About the economic valuation of tasks in the field of research and development in agricultural industry and food industry. *Lebensmittel-Industrie*. 30(2); 1983; 56-60 (German)
- 1776 CASTONGUAY (TW), APPLEGATE (EA), UPTON (DE) and STERN (JS). Hunger and appetite: Old concepts/New distinctions. *Nutr. Rev.* 41(4); 1983; 101-10

FOOD PROCESSING AND PACKAGING

PACKAGING

- 1777 ANON. Welded OTS cans as an alternative to soldered can. *Indian Food Packer*. 37(6); 1983; 60-63
Suitability of welded open-top sanitary can as an alternative to soldered can was investigated. Welded can retained good vacuum and the side seam strip lacquer in the can interior was intact. AA
- 1778 ISHIDA (O). Recent trends in the Japanese metal can industry. *Packag. Jpn.* 4(16); 1983; 38-51
Discusses: trends in demand for canned products; trend in production of metal cans; industrial structure; problems in question; and future trend. BSN
- 1779 GRUNDKE (G). The catalogue of goods damages as a means of solving packaging problems. *Lebensmittel-industrie*. 30(2); 1983; 65-8 (German)
On the basis of the findings of a survey of damaged goods published in the August 1982 issue, the author proposes the compilation of an encyclopaedia for the development, testing, and selection of packages. Apart from imparting fundamental knowledge, the encyclopaedia should also provide information on the typical damage suffered under different stresses, by various categories of goods, having different sensitivities. KMD

FOOD ENGINEERING AND EQUIPMENT

- 1780 HAYAKAWA (K-I), NONINO (C) and SUCCAR (J). Two dimensional heat conduction in food undergoing freezing: Predicting freezing time of rectangular or finitely cylindrical food. *J. Food Sci.* 48(6); 1983; 1841-8
- 1781 HAYAKAWA (K-I), NONINO (C), SUCCAR (J), COMINI (G) and DEL GIUDICE (S). Two dimensional heat conduction in food undergoing freezing: Development of computerized model. *J. Food Sci.* 48(6); 1983; 1849-53

- 1782 MOHR (KH). Mechanisms of high-pressure homogenization: Part 3. On the efficiency of the homogenization process. *Lebensmittelindustrie*. 30(2); 1983; 69-72 (German)

The efficiency of industrial, high-pressure homogenizers can be more than tripled - from $(0.15-0.30) \times 10^{-3}$ to 0.9×10^{-3} - by an energetically optimal valve design. Reduction of the homogenization pressure to the minimum value required for the production of a stable dispersion, and optimization of the values of exit pressure, homogenizing temperature, and percentage of dispersed phase can further raise the efficiency to 1.5×10^{-3} . A novel valve design, in the form of a nozzle followed by a space for a turbulence zone, can raise the efficiency to 5×10^{-3} . KMD

- 1783 WU (S), WHITNEY (LF) and PELEG (M). Viscosity evaluation of drum contents by torsional vibration. *J. Food Sci.* 48(6); 1983; 1813-6, 1828
- 1784 DORFER (G) and SEYBOTH (H). Measuring devices and sensors - Fundamentals of process automation. *Lebensmittelindustrie*. 30(2); 1983; 63-4 (German)
- 1785 KUMMER (E) and OETIKER (H). Automatic moisture control in grain. *Getreide Mehl Brot*. 37(5); 1983; 137-9 (German)

The "aquatron" has proved to be a valuable and favourably priced apparatus for maintaining a constant degree of humidity in flour mills. The apparatus is robust and has already given good service for many years. KMD

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

- 1786 ZOTTOLA (EA), WAGNER (MK) and ZOLTAI (PT). Composition and microbiology of some native Alaskan preserved foods. *J. Food Prot.* 46(5); 1983; 441-3
- 1787 STEIN (VB) and NARANG (RS). Chlorinated compounds and phenols in tissue, fat, and blood from rats fed industrial waste site soil extract: Methods and analysis. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 111-6
- 1788 LERICI (CR), PIVA (M) and DALLA ROSA (M). Water activity and freezing point depression of aqueous solutions and liquid foods. *J. Food Sci.* 48(6); 1983; 1667-9
- Water activity (a_w) of binary aqueous solutions and liquid foods (skim milk, coffee beverages, peach and tomato juices) at different total solids concentration (by weight) was evaluated, measuring freezing point depression (FPD). The calculated values differed from those obtained by electric hygrometer by less than 0.01 a_w units. Water activity was also evaluated in model systems containing ethanol, for which a_w determination by conventional electric hygrometer is not possible. AA
- 1789 LEROUX (H) and SCHUBERT (E). Applications of high-methoxyl pectins in the agro-food industries. *Ind. Aliment. Agric.* 100(9); 1983; 615-8 (French)

The authors have outlined the (i) general characteristics - structure, degree of methylation, stability - of high-methoxyl (HM) pectins; (ii) their production - raw materials, extraction, standardization; and (iii) their characteristics and uses - gel formation, viscosity, and stabilization of milk proteins. KMD

- 1790 AIYAR (AS). Analytical techniques in food processing industries. *Indian Food Packer*. 37(6); 1983; 43-6
Aspects covered include, objectives of food analysis and analytical techniques (GC, GLC, Atomic absorption spectroscopy). BSN
- 1791 NAKAMURA (A), TANAKA (R) and KASHIMOTO (T). Retention indexes for electron capture gas chromatography on programmed temperature high resolution capillary column. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 129-37
- 1792 WILHELM (VE), TEGGE (G) and VITTE (V). Comparing studies on standard methods for determination of phosphorus. *Starch*. 35(8); 1983; 282-7 (German)
Comparing studies on the applicability of four standard methods for determination of total phosphorus content of meat products, the total phosphorus content of corn starch, of cheese and of fruit juice were carried out on eight starch products of different phosphorus contents. Results were evaluated on the following criteria: Correlation between added and analytically determined phosphorus content in five corn starch products, accuracy of results, applicability of standard methods on starch products and total time spent on the analysis. The standard method for determination of total phosphorus content in corn starch showed the best correlation and the most precise results. The method for determination of phosphorus in meat-products and the method for corn starch were easily applicable on starch products. A limited applicability was found for the remaining methods. The methods for meat products and for cheese required the shortest time. The longer time of the method for corn starch mainly resulted from different decomposition techniques. The method for determination of phosphorus in corn starch was found the best in three criteria but more time was required. AA
- 1793 ASHOOR (SH), MONTE (WC) and WELTY (J). Liquid chromatographic determination of ascorbic acid in foods. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 78-80
The method involved the blending of sample (fresh/frozen fruit/vegetable, fresh/fortified canned fruit juices and powdered drinks) in a solution of EDTA, in dilute H_2SO_4 , centrifuging or filtering the mixtures and infusing a portion to LC system. JVS

FOOD LAWS AND REGULATIONS

- 1794 ZEDDELMAN (H von). The new diet order and its consequences for the producers of dietetic confectionery, dietetic sweet goods, and dietetic bread. *Getreide Mehl Brot*. 37(5); 1983; 155-7 (German)
The new Diet Order issued on 2.9.1981 contains many alterations, when compared to its predecessor. Thus, the requirement that baked goods for diabetics should contain 30% less of total carbohydrates is no longer applicable. Only the addition of certain monosaccharides (glucose), and disaccharides (grape sugar, maltose, and lactose) and of invert sugar has been banned. Greater attention is devoted to the labelling of dietetic foods, and advertising claims that were permitted earlier have been very much restricted, or

even banned. Problems arising in the manufacture of dietetic baked products have been discussed; e.g., those relating to diabetic bread, low-sodium and gluten-free products, as well as rusks for children. KMD

FOOD MICROBIOLOGY

- 1795 JAKUBCZAK (M). Rapid methods of quantitative microbiological analyses. *Ind. Aliment. Agric.* 100(9); 1983; 619-21 (French)

The author has described some rapid methods of making a total count of microflora, and of counting the indicator par excellence, of faecal contamination, viz. *Escherichia coli*. These methods are also susceptible to automation. KMD

- 1796 ANDERSON (JE), ADAMS (DM) and WALTER (WM) Jr. Conditions under which bacterial amylases survive ultrahigh temperature sterilization. *J. Food Sci.* 48(6); 1983; 1622-5, 1631

α -amylase of the thermophile *Bacillus stearothermophilus* 1518 (used as a model bacterial enzyme), when heated in the laboratory pudding at 143 C for about 22.2 seconds retained 26% of its amylolytic activity. The individual ingredients in the pudding like starch, caseinate-nonfat dry milk, oil emulsifiers, salts or sucrose had no effect on heat resistance of amylase. However, thermostability depended on any two of the ingredients, viz. starch caseinate-nonfat dry milk or oil emulsifier. Similar thermal inactivation characteristics were exhibited by *Xanthomonas campestris* 13957-2. MVG

- 1797 GOTO (T), KASUMI (T) and TSUMURA (N). Effect of glycosyl halides on glucose isomerase. Part I. Synthesis of glycosyl fluorides and their effects on the activity of glucose isomerase. *Rep. Nat. Food Res. Inst.* 58(2); 1983; 50-53 (Japanese)

α -D-glucosyl fluoride were synthesised from α -D-glucose through the consecutive procedures of acetylation, fluorination and deacetylation. α -D-glycosyl fluoride, the analogues substrate, showed no inhibitory effect on the activity of glucose isomerase. KAR

- 1798 CHEN (HC) and ZALL (RR). Continuous lactose hydrolysis in fixed-bed and expanded-bed reactors containing catalytic resins. *J. Food Sci.* 48(6); 1983; 1741-4, 1757

Kinetics of lactose hydrolysis in a resin-catalysed process have been investigated to develop an appropriate technology for the continuous hydrolysis of lactose and whey (viz. the expanded bed process). Results show that the process follows a first-order kinetics where reaction rates depend upon temperature and acid (catalyst) concentration and are independent of initial substrate (lactose) concentration. The newly developed expanded bed process seemed capable of being operated continuously using acidified-deproteinated whey as substrate and could provide higher percentage of hydrolysis in short time. MVG

- 1799 PARIZA (MW) and FOSTER (EM). Determining the safety of enzymes used in food processing. *J. Food Prot.* 46(5); 1983; 453-68

Discusses: general consideration; historical examples of enzyme use; modern uses of enzymes; pharmaceutical/medical applications; other uses; future applications of enzymes; enzymes from animals and microorganisms; organic selection; large scale growth; enzyme extraction, concentration and

standardization; immobilized enzymes; consumption levels; current status of enzyme safety; safety considerations; pathogenicity; carcinogens and mutagens; teratogens and reproductive effects; antibiotics; allergies and primary irritations; products of enzymic reactions; direct effects of food enzymes on consumers; concept of relative safety; and guidelines for determining enzyme safety. BSN

- 1800 THOMPSON (PJ) and GRIFFITH (MA). Identity of mesophilic sporeformers cultured from recycled cannery cooling water. *J. Food Prot.* 46(5); 1983; 400-402

YEAST

- 1801 BARBER (S), BENEDITO DE BARBER (C), BAGUENA (R), GONZALEZ-CAUDELI (C) and PLANELLIS (V). Quality of compressed bakers' yeast and effects of commercial distribution. *Rev. Agroquím Tecnol. Aliment.* 23(2); 1983; 237-50 (Spanish)

ALGAE

- 1802 ANUSUYA DEVI (M) and VENKATARAMAN (LV). The effect of algal protein diets on the regeneration of serum and liver proteins in protein depleted rats. *Qualitas plantarum.* 33(4); 1983; 287-97

The protein quality of algae *Spirulina platensis* was evaluated biochemically in adult albino rats by serum protein regeneration studies. Rats depleted for 12 days were repleted for 15 days with diets containing 10% protein derived from algae, methionine supplemented algae, or casein. On protein depletion, the activity of the hepatic enzymes, succinic dehydrogenase and alanine aminotransferase, were lowered while the activity of alkaline phosphatase increased. Protein repletion with algal and casein diets resulted in an increased activity of succinic dehydrogenase and alanine aminotransferase and a decrease in alkaline phosphatase activity. However, the levels of these three enzymes were lower with the algal than with the casein diets. Algal diets regenerated serum protein effectively though to a slightly lesser extent than casein. AA

MUSHROOM

- 1803 MacLEOD (AJ) and PANCHASARA (SD). Volatile aroma components, particularly glucosinolate products, of cooked edible mushroom (*Agaricus bisporus*) and cooked dried mushroom. *Phytochemistry.* 22(3); 1983; 705-9

The aroma volatiles of cooked edible mushroom (*Agaricus bisporus*) were extracted and concentrated to a valid essence using well-established techniques. Analysis by conventional GC and GC/MS showed at least 40 components (total Ca 150 µg/g), including trace amounts of benzyl isothiocyanate which indicated the presence of benzylglucosinolate in *A. bisporus*. Previously identified C₈ components, which are important to the characteristic flavour of mushroom, were also obtained, with oct-1-en-3-ol contributing Ca 59% (Ca 88 µg/g) to the sample. A new mushroom volatile was detected, cyclo-octanol (Ca 24%, 36 µg/g), presumably formed by cyclization of oct-1-en-3-ol during cooking. The C₈ compounds comprised Ca 98% of the sample. The volatiles of cooked dried mushrooms (total Ca 500 µg/g) were very different and only one of the seven C₈ compounds, oct-1-en-3-one (Ca 1.5%), survived

processing. a number of pyrazines and other thermally-produced artefacts of processing were recognized. Benzyl cyanide as well as benzyl isothiocyanate was identified in dried mushroom samples, providing further evidence of the presence of benzylglucosinolate in edible mushroom. No 2-phenethylglucosinolate products could be detected in any mushroom samples, even using highly sensitive SIM searches during GC/MS. AA

FOOD ADDITIVES

- 804 ANON. Seminar on "Additives in Our Food", Berlin, 1983. RAK 33(2); 1983; 34-7 (German)

Summaries of four of the papers presented at the seminar are published here. K.F. GANDER - Additives in modern food technology; H.P. MOLLENBAUER The granting of official permission for an additive - "Our food additives have been officially tested"; F.H. KEMPER - Evaluation of additives from the standpoint of health; and E. AUGSTEIN-RIDDER - How does the consumer look at the declaration of additives in foodstuffs? KMD

- 805 YAMADA (F), NISHIYAMA (T) and NAKAI (Y). A study of benzylphenols as anti-oxidants. *J. Am. Oil Chem. Soc.* 60(9); 1983; 1651-2

- 806 GERTZ (C) and HERRMANN (K). Identification and determination of antioxidants in food. *Z. Lebensmittel-Unters Forsch.* 177(3); 1983; 186-92 (German)

A simple analytical method for the identification and determination of fifteen different antioxidants in food is described using High Performance Liquid Chromatography with spectrofluorescence and UV-absorbance detection. All antioxidants are extracted by a solvent mixture consisting of acetonitrile, 2-propanol, ethanol and oxalic acid. 2,6-Diisopropylphenol is added as internal standard. After refrigerating and separating interfering materials by centrifugation, the extract can be analysed without any further clean-up. For the qualitative evaluation the extract is separated by thin-layer chromatography. The antioxidants are identified by spraying with various colouring reagents. AA

- 807 SCHAFER (H) and SCHERZ (H). Analysis of polysaccharides used as food additives. VII. Zone electrophoresis on dimethyldichlorosilane-pretreated glass fiber sheets *Z. Lebensmittel-Unters. Forsch.* 177(3); 1983; 193-5 (German)

Polysaccharides used as thickening agents can be separated by electrophoresis in borate buffered medium on glassfiber sheets, which have been deactivated by treatment with dimethyldichlorosilane. This system has the advantage, that for visualisation of the separated compounds more active reagents can be used, which are more sensitive and specific than the staining procedures applied with cellulose acetate sheets. The method has been tested successfully on a series of foods. AA

- 808 HUSSEIN (MM), KACHIKIAN (R) and PIDEL (AR). Analysis for flavour residuals in the mouth by gas chromatography. *J. Food Sci.* 48(6); 1983; 1884-5

Analyses for trace flavourants in the mouth were performed by extraction of aqueous mouth rinses with methylene chloride, concentration of the extract, and gas chromatographic analysis of the concentrate. Trace flavourants were determined after chewing peppermint-flavoured gum and after rinsing with mouthwashes. The durability of several flavourants in the

mouth was compared. The data obtained show that flavourants differ in their retainability in the mouth, as judged from the amount of their residuals. Menthol and anethole are retained longer than most common flavourants. Flavour esters are partially hydrolyzed in the mouth to give the corresponding alcohols. Aldehydes are also affected and produce their corresponding alcohols. AA

- 1809 HARPER (EK) and SHOEMAKER (CF). Effect of locust bean gum and selected sweetening agents on ice recrystallization rates. *J. Food Sci.* 48(6); 1983; 1801-3, 1806

A method has been developed to study the effect of sweeteners and a stabiliser on the rate of ice recrystallisation and demonstrated on aqueous solutions containing sucrose, a high conversion corn syrup, a high fructose corn syrup and locust bean gum. MVG

- 1810 BAILEY (JE) Jr. Reverse phase liquid chromatographic determination of intermediates and subsidiary colours in D and C Green No. 5. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 55-61

In this method, octadecylsilanized silica gel as stationary phase and gradient elution using aqueous acetonitrile solution containing ammonium acetate have been used. Quantitation of intermediates upto 0.2% (w/w) and of subsidiary colour up to 0.3% (w/w) was possible. JVS

CEREALS

- 1811 MAYFIELD (J). Calculating germ value to save wasted flour. *Milling Feed Farm Supplies.* 166(5); 1983; 36-7

- 1812 FRETZDORFF (B) and WEIPERT (D). A nephelometric method for the measurement of α -amylase activity in cereals. *Z. Lebensmittel-Unters Forsch.* 177(3); 1983; 167-72 (German)

- 1813 CHELKOWSKI (J) and GOLINSKI (P). Mycotoxins in cereal grain. Part VII. A simple method to assay mycotoxin potential of cereal grain and cereal products. *Nahrung.* 27(4); 1983; 305-10

A simple test to assay mycotoxin potential of cereal grain and products was elaborated. During 1977 and 1981, formation of ochratoxin A, citrinin and zearalenone was observed respectively in 40%, 7% and 31% of samples. Aflatoxin and sterigmatocystin were not formed in any sample of cereal grain. Citrinin and penicillic acid were found as mycotoxins accompanying ochratoxin. A. AA

- 1814 CHELKOWSKI (J), TROJANOWSKA (K) and WIEWIOROWSKA (M). Mycotoxins in cereal grain. Part VIII. Microbiological evaluation of cereal grain quality, connected with mycotoxins occurrence. *Nahrung.* 27(4); 1983; 311-8

Four classes of microbiological quality of cereal grain are proposed. For classification, the frequency of kernel contamination with *Penicillia*, *Aspergilli* and *Phycomycetes* is considered as essential. Lots contaminated with mycotoxins (ochratoxins) were usually of IIIrd and IVth class quality. AA

- 1815 REICHMUTH (Ch) and NOACK (S). Evaluation of environmental impact of fumigation of cereals. *Getreide Mehl Brot.* 37(5); 1983; 139-44 (German)

Salad and cress plants were used to study the effects of toxic fumigant on plants. Methyl bromide produced visible damage at a dose of 400 mg/m^3 , while no damage was caused by methyl bromide at a dose as high as 1400 mg/m^3 . The damage threshold in the case of phosphine lay between 3 and 8 mg/m^3 . All these concentrations were much higher than those obtained in a practical fumigation from a distance of 10 m. As salad and cress are the plants most sensitive to fumigation, the use of the above-mentioned chemicals from a distance of 10 m, may be considered to be safe. KMD

RICE

- 1816 PEDERSEN (B) and EGGUM (BO). The influence of milling on the nutritive value of flour from cereal grains. *Qualitas plantarum*. 33(4); 1983; 267-78
Protein content of highly refined white rice (HRF) was reduced to 86%, while mineral content was so by 23% as compared to brown rice (BR). Zinc content was reduced to almost 50% of BR in HRF. Although amino acid composition was slightly affected, lysine concentration was lower in HRF as compared to BR. Milling resulted in increase in true protein digestibility and a corresponding decrease in biological value. During milling, 33% of utilizable protein and 22% digestible energy in rice was reduced. Experiments with rats have further revealed that zinc might act as a growth limiting factor in rice-based diets. BSN
- 1817 CHINNASWAMY (R) and BHATTACHARYA (KR). Studies on expanded rice. Physico-chemical basis of varietal differences. *J. Food Sci.* 48(6); 1983; 1600-603
Extent of expansion of milled parboiled rice when heated varied widely among 35 varieties. Expansion correlated strongly with the amylose content, being maximum at 27% total amylose and/or 13.5% hot-water/insoluble amylose. In general rice quality type II gave the highest expansion. Protein content had a small negative correlation. Mineral content of the milled grain had no effect. The influence of grain gelatinization temperature is uncertain. Overall shape of the rice grain remained largely unchanged after expansion. AA
- 1818 CHINNASWAMY (R) and BHATTACHARYA (KR). Studies on expanded rice. Optimum processing conditions. *J. Food Sci.* 48(6); 1983; 1604-8
Optimum conditions of parboiling, milling and puffing for making expanded rice were studied on a small laboratory scale. Optimum puffing was obtained by heating milled parboiled rice at a moisture content of 10.5-11% with 15 times its weight of fine sand at 250°C for 10-11 seconds. Raw and mildly parboiled rice gave minimal expansion, which increased with increasing severity of parboiling up to a steam pressure of 1.5 kg/cm^2 . However, rice parboiled by heating with sand (250°C , 2.5 minutes) expanded best. Starch retrogradation after parboiling reduced expansion, as did cracked and broken grains and insufficient milling of the rice. Addition of salt increased expansion. Expansion initially increased and then decreased with increasing age of paddy after harvest. AA
- 1819 YANASE (H), ENDO (I), SHIBUYA (N) and OHTSUBO (K). Product quality and raw materials of puffed rice by batch-type and extruder-type methods. Part I. Selection of raw materials: glutinous and non-glutinous rice, upland and lowland rice, and new and old rice. *Rep. Nat. Food Res. Inst.* 58(2); 1983; 39-49 (Japanese)
Puffed rice prepared from glutinous and nonglutinous rice varieties by extruder type method were compared. Puffed rice prepared from 3 year old rice

was particularly inferior with respect to colour. For puffing, the appropriate moisture content of the rice material was between 11 and 15%. Puffed rice powder from batch type products was more suitable for making paste than that from extruder-type products. KAR

WHEAT

- 1820 BOLLING (H) and El BAYA (AW). Changes in lipid composition during germination and ripening of grain kernels. *Getreide Mehl Brot.* 37(5); 1983; 144-7 (German)

During the germination of wheat grains, the total lipid content decreased for the first 72 hours, and increased thereafter. The germinated grains contained greater amounts of lecithin, and of cephalin or galactolipids than the ungerminated grains. Lysolecithin is absent during the development of the plant; it is first formed from lecithin, after fruiting in the vegetative state. The content of galactolipids in wheat does not undergo any notable change during maturation. The lipids in maize behave in the same way as the wheat lipids, during germination, or maturation. KAR

- 1821 DESHPANDE (SS), RANGNEKAR (PD), SATHE (SK) and SALUNKHE (DK). Functional properties of wheat-bean composite flours. *J. Food Sci.* 48(6); 1983; 1659-62

Functional properties of wheat flour and its blends with six bean flours at three levels of replacement (10, 20, and 30%) were investigated. Water and oil absorption, foaming capacity and stability, and emulsifying activity and stability increased with increasing levels of bean flours in the blends. Composite flours had higher pasting properties compared to those of wheat flour as measured in the Brabender Viscoamylograph. As the level of bean flour in the composite was increased, farinograph absorption and mixing tolerance index increased, whereas mixing time and dough stability decreased. AA

- 1822 PAGENSTEDT (B). Mechanization of prefermented wheat doughs. *Getreide Mehl Brot.* 37(5); 1983; 147-53 (German)

While fermented dough is being added more and more for the production of rye-containing breads, such is not the case in the manufacture of wheat bread. The history of dough processing for manufacture of wheat bread has been reviewed, and the technical facilities now available for continuous bread production have explained in detail. Particular attention has to be given to the plate heat-exchangers and pumps. KMD

- 1823 KACPRZAK (JL), GEYER (R) and COOPER (C). Capillary gas chromatographic determination of naphthalene in bran and wheat germ products. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 106-8

Naphthalene was distilled from water-cereal mixture and the distillate was extracted with hexane. A 10 micro-litre sample is injected into a GC equipped with a capillary column. Dodecan-1-ol was used as an internal standard. Detection limit for the method was 0.5 ppm. Mean recoveries from samples of unprocessed bran, unprocessed wheat germ, and bran flake, breakfast cereal spiked with naphthalene were, 1.0, 2.5 and 5 ppm respectively. JVS

- 1824 LEE (SC) and CHU (FS). Enzyme-linked immunosorbent assay of ochratoxin A in wheat. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 45-9

The methanolic extract of ochratoxin A was diluted, and passed through a cartridge. The ochratoxin A was eluted from cartridge with 85% methanol and concentrated. The solution in 0.1M, pH 7.5 sodium phosphate - Tween 20 buffer and 5% methanol was subjected to immunosorbent assay using a horse-radish peroxidase as enzyme-marker. Minimal detection of toxin in wheat sample at 1-2 ppb level after clean-up was possible. JVS

- 1825 TRUCKSESS (MW), NESHEIM (S) and EPPLEY (RM). Thin layer chromatographic determination of deoxynivalenol in wheat and corn. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 40-43

DON was extracted from corn by using acetonitrile-water, filtered through a alumina-charcoal-celite column, evaporated on a steam bath, cooled and residue dissolved in CHCl_3 -acetonitrile for TLC on a silica gel plate impregnated with AlCl_3 . The solvent system used was CHCl_3 -acetone-propanol. The quantitation was by visual or fluorodensitometric comparison with reference standards (limit of determination, 40 ng/g for wheat; 100ng/g for corn) JVS

- 1826 EPPLEY (RM), TRUCKSESS (MW), NESHEIM (S), THORPE (CW), WOOD (GE) and POHLAND (AE). Deoxynivalenol in winter wheat: Thin layer chromatographic method and survey. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 43-5

The method involved extraction of sample with acetonitrile-water, clean-up by charcoal-alumina column chromatography and determination by TLC using a spray of AlCl_3 and heat to develop a fluorescent compound. The levels of DON was found to range from 0.2 to 9.0 mcg/g in 54 of the 57 wheat samples of USA. JVS

- 1827 CHANG (HL), DEVRIES (JW), LARSON (PA) and PATEL (HH). Rapid determination of deoxynivalenol (vomitoxin) by liquid chromatography using modified Pomer column cleanup. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 52-4

The method was evaluated using wheat, wheat flour, and other wheat products. The sample is extracted with acetonitrile-water (84+16), and an aliquot of the extract is subjected to activated charcoal-alumina column chromatography. The extract is then evaporated and diluted to volume with mobile phase, and DON is quantitated using liquid chromatography. The relative standard deviation based on duplicate samples is 6.07%. The detection limit is 30 ppb based on 2 x signal/noise ratio. Results by this method compared with the results obtained by the Scott GC method showed a correlation coefficient of 0.992 with a mean vomitoxin content of 779 ppb by this method and 716 ppb by the Scott method for 14 samples. AA

- 1828 RANGASWAMY (JR). Simple spectrophotometric method for determination of phosphine residues in wheat. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 117-20

A method has been developed for determination of phosphine residues in wheat, based on the reaction of phosphine with silver nitrate in aqueous solution to form an egg-yellow chromophore with an absorption maximum at 400 nm. At this wavelength, there is a linear relationship between absorbance and concentration of phosphine in the range 10-100 ng/mL. Phosphine-fumigated wheat is soaked in a known volume of AgNO_3 solution, and the absorbance of the filtrate is read against a blank at 400 nm. The method is sensitive, with lower detection and estimation limits of 0.008 and 0.01 $\mu\text{g pH}_3$, respectively. Recovery of added phosphine from a closed system was 85-100%. Accuracy for this method has been compared with that for the gas chromatographic method. AA

MILLETS

- 1829 ANON. Millet - A possibly goitrogenic cereal. *Nutr. Rev.* 41(4); 1983; 113-5

FINGER MILLET (RAGI)

- 1830 KANCHANA (S) and SHURPALEKAR (KS). Effect of incorporating ragi (*Eleusine coracana*) husk in semisynthetic diets. *Qualitas Plantarum.* 33(4); 1983; 279-85

Ragi husk at 8% level in rat diet promoted better growth, nitrogen efficiency and higher PER. Protein content of carcasses and liver of rats was higher as compared to control. BSN

SORGHUM

- 1831 PEDERSEN (B) and EGGUM (BO). The influence of milling on the nutritive value of flour from cereal grains. 6. Sorghum. *Qualitas Plantarum.* 33(4); 1983; 313-26

Low-tannin sorghum was milled into flour with extraction rates between 100 and 64%. The nutritive value of the flours was studied by chemical analyses and in balance experiments with growing rats. The effects of amino acid supplementation was also examined. In general, the content of essential nutrients decreased when the extraction rate was lowered, but the content of fibre, tannins and phytate was also significantly reduced by milling. The digestibility of energy as well as protein was high, but the protein quality was poor, especially in flours of low extraction. Amino acid supplementation improved protein utilization and weight gain considerably. Femur zinc concentration was significantly depressed in the rats fed the amino acid supplemented diets, and sorghum seems to be a poor source of available zinc, in particular when it is highly refined. The poor zinc availability may be attributed to the high content of phytate. AA

- 1832 OKEIYI (EC) and FUTRELL (MF). Evaluation of protein quality of formulations of sorghum grain flour and legume seeds. *Nutr. Rep. Int.* 28(3); 1983; 451-61

High protein products containing blend of vegetable proteins of soyabean flour, sorghum flour, and wheat flour could be developed to use in child feeding programmes. One of the products developed met the FAO essential amino acid patterns. KAR

- 1833 SUBRAMANIAN (V), JAMBUNATHAN (R) and SAMBASIVA RAO (N). Textural properties of sorghum dough. *J. Food Sci.* 48(6); 1983; 1650-53, 1673

MAIZE

- 1834 PEDERSEN (B) and EGGUM (BO). The influence of milling on the nutritive value of flour from cereal grains. 5. Maize. *Qualitas Plantarum.* 33(4); 1983; 299-311

Whole meal (WM), three sifted flours (SF) and degermed maize (DM) obtained by dry milling of yellow maize were used in the rat assay studies. Differences in nitrogen content between milled fractions were significant. Phytate:zinc molar ratios ranged between 43 to 2, while weight gains of rats was closely correlated to concentration of lysine ($r = 0.99$) and tryptophan ($r = 0.97$). Rats fed DM showed almost half the weight gain as compared to WM fed rats. Protein digestibility was high and protein quality varied between fractions. Energy density of flours was almost similar. Zinc utilization appears to be influenced by factors present in whole maize. Lysine and tryptophan supplementation of whole meal increased the biological value of protein and weight gain significantly. BSN

- 1835 TRANTHAM (AL) and WILSON (DM). Fluorometric screening method for citrinin in corn, barley, and peanuts. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 37-8

A fluorometric method is described for rapid screening of citrinin in corn, barley, and peanuts. The initial extraction uses an aqueous acidified acetonitrile solution, and the resulting extract is partially purified by several acid-base partition steps. Citrinin is determined by using a fluorometer. Mean recoveries of added citrinin from corn, barley, and peanuts were 56.4, 66.6, and 40.0%, respectively, at levels of 100-8000 ng/g. AA

- 1836 GIMENO (A). Determination of citrinin in corn and barley on thin layer chromatographic plates impregnated with glycolic acid. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 194-6

The mycotoxin is extracted with a mixture of acetonitrile 10% glycolic acid in water, defatted with isooctane, and transferred to chloroform according to published methods. The mycotoxin is separated by thin layer chromatography (TLC) on plates previously impregnated with 10% glycolic acid solution in ethanol; identity is confirmed by chemical tests. Citrinin is then quantitated by the limit detection method. Recoveries of citrinin from corn and barley samples spiked at levels of 50, 80, 150, 300, 500, and 1000 $\mu\text{g/kg}$ were in the range 91-98%. The minimum detectable concentration is 15-20 $\mu\text{g/kg}$. Recoveries obtained with and without glycolic acid in the extraction solvent were compared. Sensitivities on TLC plates (limits of detection, $\mu\text{g/spot}$) impregnated with glycolic acid were compared with those on plates impregnated with oxalic acid. AA

- 1837 HORN (BW) and WICKLOW (DT). Factors influencing the inhibition of aflatoxin production in corn by *Aspergillus niger*. *Can. J. Microbiol.* 29(9); 1983; 1087-91

Aspergillus niger, a mold commonly associated with *Aspergillus flavus* in damaged corn, interferes with the production of aflatoxin when grown with *A. flavus* on autoclaved corn. The pH of corn-meal disks was adjusted using NaOH-HCl, citric acid - sodium citrate, or a water extract of *A. niger* fermented corn. Aflatoxin formation was completely inhibited below pH 2.8-3.0, irrespective of the system used for pH adjustment. When grown in association with *A. flavus* NRRL 6432 on autoclaved corn kernels *A. niger* NRRL 6411 lowered substrate pH sufficiently to suppress aflatoxin production. The biodegradation of aflatoxin B₁ or its conversion to aflatoxin B_{2a} were eliminated as potential mechanisms by which *A. niger* reduces aflatoxin contamination. A water extract of corn kernels fermented with *A. niger* caused an additional inhibition of aflatoxin formation apart from the effects of pH. AA

- 1838 SCOTT (PM), LAWRENCE (GA), TELLI (A) and IYENGAR (JR). Preparation of deoxynivalenol (vomitoxin) from field-inoculated corn. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 32-4

A process was developed for production of gram quantities of deoxynivalenol (DON) from corn that had been inoculated in the field with *Fusarium graminearum* and was estimated to contain 400-500 mg DON/kg. Steps in the purification procedure included extraction with methanol-water (1+1), partition from an aqueous solution into ethyl acetate by using a hydrophilic matrix, defatting, Florisil column chromatography, methylene chloride-water partition, semipreparative liquid chromatography (LC), and crystallization from ethyl acetate. The average yield of crystalline DON produced by this method (or with minor variations) was 281 mg/kg. AA

- 1839 TUNSTALL (J). Maize flour. *Mill. Feed Farm Supplies.* 166(7); 1983; 30-31, 33

- 1840 TONELLA (ML), SANCHEZ (M) and SALAZAR (MG). Physical, chemical, nutritional and sensory properties of corn-based fortified food products. *J. Food Sci.* 48(6); 1983; 1637-43

Various formulations and processing methods were developed with corn flours fortified with various levels of sesame, chickpea, soyabeans, egg powder, nonfat dry milk, lysine and methionine. The formulations provided closely for FAO requirements of essential amino acids and acceptable physically, chemically, nutritionally and in sensory properties and cost. The formulations had an overall increase of at least 92% in nutritional value as compared to existing products. MVG

PULSES

PEA

- 1841 SANCHEZ (J), KHOR (HT) and HARWOOD (JL). Fatty acid metabolism by a particulate fraction from germinating peas. *Phytochemistry.* 22(4); 1983; 849-54

FRENCH BEAN

- 1842 PINAGA (F), CARBONELL (JV), MADARRD (A) and PENA (JL). Dehydration of fruits and vegetables by ambient air. III Comparative trials on solar drying of green beans. *Rev. Agroquim Tecnol Aliment.* 23(2); 1983; 251-61 (Spanish)

The kinetics of drying of green beans (*Phaseolus vulgaris*) by three different processes have been studied. The processes are : (a) drying with ambient air (22-23 C and 40-50% RH); (b) drying with air heated by solar energy; and (c) a two -step method which first uses ambient air and then resorts to solar drying. Only process (c) when started at sunset can complete the drying within 24 hour. When compared to the control sample (dried in air at 66 C) the samples treated according to (a) and (c) manifest a stronger green colour and a faster and more complete reconstitution. No differences in vitamin C content and shrinkage ratio could be detected among the samples studied. KMD

- 1843 SATHE (SK), DESHPANDE (SS), REDDY (NR), GOLL (DE) and SALUNKHE (DK). Effects of germination on proteins, raffinose, oligosaccharides and antinutritional factors in the great Northern beans (*Phaseolus vulgaris*). *J. Food Sci.* 48(6); 1983; 1796-800

Germination for 5 days substantially hydrolysed major reserve proteins. However, they could not be completely degraded as shown by *in vitro* trypsin digestion of the extracted major storage proteins. Moist heat treatment (90-30 minutes) improved *in vitro* susceptibility of the extracted proteins. During germination there was substantial increase in soluble essential amino acids. Stachiose + raffinose (76.40%) decreased highest at the end of 3rd day of germination. After 5 days, trypsin, chymotrypsin α -amylase inhibitory activities, and phytic acid were reduced by 62.9%, 73.4%, 67.1% and 57.8% respectively. MVG

- 1844 NIELSEN (B), HEVIA (P), and BRITO (O). Study on the complementation of two proteins of low quality: Black bean (*Phaseolus vulgaris*) and sesame (*Sesamum indicum* L.). *J. Food Sci.* 48(6); 1983; 1804-6

Addition of sesame protein to a black bean diet dramatically improved the quality of proteins. The protein of neither seed in a cholesterol-free diet affected the levels of circulating lipids. MVG

- 1845 BUERA (MP), POLLIO (ML), PILOSOF (AM) and BARTHOLOMAI (GA). Kinetics of soluble nitrogen and available lysine losses in thermal treatment of bean (*Phaseolus vulgaris*) flour. *Rev. Agroquim Tecnol Aliment.* 23(2); 1983; 262-8 (Spanish)

The effect of time, temperature and moisture content of the loss of available lysine (AL) and of soluble nitrogen (SN) in thermal treatment of bean (*Phaseolus vulgaris*) flour was studied. Temperature and moisture content ranges considered were 70-100 C and 0.5-44%, respectively. Results showed that AL and SN losses follow a first-order kinetics. Moisture content shows a great effect on AL and SN losses, with a maximum effect about 30% moisture. Activation energy values showed that SN loss is more influenced by treatment temperature than AL loss. AA

- 1846 LEE (JP), UEBERSAX (MA), ZABIK (ME), HOSFIELD (GL) and LUSAS (EW). Physico-chemical characteristics of dry-roasted navy bean flour fractions. *J. Food Sci.* 48(6); 1983; 1860-62, 1875

COWPEA

- 1847 PHILLIPS (RD), CHHINNAN (MS) and MENDOZA (LG). Effect of temperature and moisture content on the kinetics of trypsin inhibitor activity, protein *in vitro* digestibility and nitrogen solubility of cowpea flour. *J. Food Sci.* 48(6); 1983; 1863-7

FABA BEAN

- 1848 SCHWENKE (KD), RAUSCHAL (EJ) and ROBOWSKY (KD). Functional properties of plant proteins part IV. Foaming properties of modified proteins from faba beans. *Nahrung.* 27(4); 1983; 335-50

- 1849 WECK (M), HANEFELD (M), LEONHARDT (W), HALLER (H), ROBOWSKY (K-D), NOACK (R) and SCHMANDKE (H). *Vicia faba* protein diet in hypercholesterolemia. *Nahrung*. 27(4); 1983; 327-3 (German)

The lipid-lowering effects of *Vicia faba* protein are well-known only from animal experiments. That we examined the effects in a group of patients with hypercholesterolemia (HLP type IIa) and observed the cholesterol-reducing efficacy of the *Vicia faba* protein as comparable to soy protein diets. AA

- 1850 RAO (VS) and VAKIL (UK). Effects of gamma-irradiation on flatulence-causing oligosaccharides in green gram (*Phaseolus aureus*). *J. Food Sci.* 48(6); 1983; 1791-5

Radiation treatment was found effective in the elimination of oligosaccharides during germination. MVS

HORSE BEAN

- 1851 LUDWIG (E) and WINKLER (H). Researches concerning the formation of plastein gels from partially split horse bean protein isolate. *Nahrung*. 27(4); 1983; 319-25 (German)

Peptic partial hydrolysates of a different hydrolysis degree were prepared from horse bean protein isolate and used for the plastein reaction with thermitase. Whilst insoluble products were formed from partial hydrolysates of a hydrolysis degree about 60%, plastein gel could be obtained from a less intensely split basic material. By gel chromatography and by determination of the percentage which was insoluble in 10% trichloroacetic acid, a proteolytic degradation could be prepared under the conditions of the plastein reaction. On addition of DL-methionine ethylesters to the partial hydrolysate, an increasing incorporation of methionine into the plastein could be observed with increasing hydrolysis degree. AA

MUNG BEAN

- 1852 BUESCHER (RW) and CHANG (JS). Quality improvement of canned mung bean (*Vigna radiata*) sprouts. *J. Food Sci.* 48(6); 1983; 1598-9, 1603

Effect of calcium chloride (firming agent), ascorbic acid (antioxidant) citric acid (acidulant, sequesterant) and ethylenediaminetetra acetic acid (EDTA, sequesterant) on texture, colour and flavour of mung bean sprouts processed as a low acid (pH >4.6) food as well as of acidulants on sprouts processed as an acid food (pH >4.6) were investigated. Ca addition or acidification improved texture. Texture of canned mung bean as low acid food increased with decreasing pH. EDTA with ascorbic acid or acidification improved colour. Processing in uncooked cans or acetic acid treatment was detrimental to flavour. It was concluded that the best low acid food was obtained by the combination of Ca, ascorbic acid, citric acid and EDTA, while the best acid food was obtained by acidification by gluconic acid. MVG

OILSEEDS AND NUTS

- 1853 SAURA-CALIXTO (F), CANELLAS (J) and GARCIA-RASO (J). Determination of hemicellulose, cellulose and lignin contents of dietary fibre and crude fibre of several seed hulls. Data comparison. *Z. Lebensmittel-Unters Forsch.* 177(3); 1983; 200-202

The contents of hemicellulose, cellulose and lignin in neutral-detergent fibre, and acid-detergent fibre in hulls of hazelnuts, peanuts, coconuts, sunflower seeds, pumpkin seeds, acorns and chestnuts were determined. Similar cell-wall characteristics for sunflower-acorn, peanut-pumpkin and hazelnut-chestnut pairs can be deduced from their similar composition. High amounts of hemicellulose and lower ones of cellulose and lignin are dissolved in the process of determining crude fibre. The results are discussed. AA

COTTONSEED

- 1854 LEE (LS), KOLTUN (SP) and BUCO (S). Aflatoxin distribution in fines and meats from decorticated cottonseed. *J. Am. Oil Chem. Soc.* 60(8); 1983; 1548-9

Nine samples of fuzzy cottonseed potentially high in aflatoxin were separated into hulls, fines and meats. Assays for aflatoxin on triplicate 50-g portions from fines (small, dry particles of kernels) and meats from each of the nine samples indicated a marked concentration of toxin in the fines. On average, there was a 17-fold difference between the aflatoxin content of the fines and that of the meats; the average toxin level in fines was 4024 µg/kg and that in the meat samples was 232 µg/kg. These results indicate a potential for marked reduction in aflatoxin content of processed cottonseed meal by physical removal of fines from meats after dehulling and before processing of meats into oil and meal. AA

MUSTARD

- 1855 GURURAJ RAO (A) and NARASINGA RAO (MS). Effect of sodium dodecyl sulphate on the high molecular weight protein fraction of mustard (*Brassica juncea*) and rapeseed (*Brassica campestris*). *J. Biosci.* 5(4); 1983; 301-9

The effect of sodium dodecyl sulphate on mustard and rapeseed 12 S protein has been monitored by the techniques of ultracentrifugation, viscosity difference spectra and fluorescence spectrophotometry. At low concentration of sodium dodecyl sulphate (< 3.47 mM) mustard protein undergoes aggregation and at higher concentrations it dissociates to 1.8 S protein, the dissociation being complete at 17.3 mM sodium dodecyl sulphate. The rapeseed protein on the other hand, undergoes dissociation at all the concentrations of sodium dodecyl sulphate. The reduced viscosity values of mustard protein in the presence of the denaturant are higher than those of rapeseed protein. Similarly, in difference spectra change in absorbance values of mustard protein are higher. The relative fluorescence intensity of the mustard protein increases with sodium dodecyl sulphate concentration, upto 0.87 mM and this is followed by fluorescence quenching at higher denaturant concentrations. However, with the rapeseed protein fluorescence, quenching was observed at all concentrations of sodium dodecyl sulphate. AA

- 1856 GURURAJ RAO (A) and NARASINGA RAO (MS). Denaturation of the high molecular weight protein fraction of mustard (*Brassica juncea*) and rapeseed (*Brassica campestris*) by urea or guanidinium hydrochloride. *J. Biosci.* 5(4); 1983; 311-20

Urea and guanidinium hydrochloride dissociate the 12 S protein of mustard and rapeseed to 1.8 S protein and the extent of dissociation depends on the concentration of the denaturant. Mustard (*Brassica juncea*) protein is

more readily dissociated than the rapeseed (*Brassica campestris*) protein. The reagents denature the protein as evidenced by increase in viscosity, appearance of difference spectra and quenching of fluorescence. Rapeseed protein is denatured more readily than the mustard protein. Analysis of viscosity, spectral and fluorescence data suggests that the first event in the denaturation reaction is the perturbation of the aromatic amino acid residues followed by their exposure to the solvent medium and unfolding of the protein molecule. AA

RAPESEED

- 1857 LACROIX (M), AMIOT (J) and BRISSON (GJ). Hydrolysis and ultrafiltration treatment to improve the nutritive value of rapeseed proteins. *J. Food Sci.* 48(6); 1983; 1644-5

Rapeseed hydrolysates and ultrafiltrates obtained by hydrolysis with pepsin and trypsin followed by centrifugation and ultrafiltration had net protein ratios (4.68 and 4.55 respectively) higher ($P < 0.05$) than that of casein (4.40). Ultrafiltrate had somewhat similar protein digestibility (90.3) as casein but higher than raw rapeseed flour (81.9). The above treatment improved protein nutritive value by enabling isolation of byproducts of a molecular weight lower than 5000 daltons. MVG

SOYABEAN

- 1858 CHIN (K-DH) and KOEHLER (PE). Identification and estimation of histamine, tryptamine, phenethylamine and tyramine in soy sauce by thin-layer chromatography of dansyl derivatives. *J. Food Sci.* 48(6); 1983; 1826-8

SUNFLOWER SEED

- 1859 GASSMAN (B). Preparation and application of vegetable proteins, especially proteins from sunflower seed, for human consumption. An approach. *Nahrung.* 27(4); 1983; 351-69
- 1860 NAGAO (A) and YAMAZAKI (M). Lipid of sunflower seeds produced in Japan. *J. Am. Oil Chem. Soc.* 60(9); 1983; 1654-8

PENTACLETHRA MACHROPHYLLA

- 1861 ACHINEWHU (SC). Protein quality of African oil bean seed (*Pentaclethra machrophylla*). *J. Food Sci.* 48(4); 1983; 1374-5

GROUNDNUT

- 1862 TOSCH (D), WALKING (AE) and SCHLESIER (JF). Past and present research on aflatoxin in peanut products. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 8-9
- 1863 WHITAKER (TB), DICKENS (JW) and GIESBRECHT (FG). Effects of methanol concentration and solvent: Peanut ratio on extraction of aflatoxin from raw peanuts. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 35-6

The extraction of aflatoxin by a water slurry process and AOAC method II was compared by using 55 to 70% methyl alcohol levels and 3 to 6 mL/g. of solvent-peanut ratios. In the water slurry method, the extraction of aflatoxin B₁ increased with the solvent-peanut ratio. In the AOAC method II, the percentage of extraction increased by methyl alcohol concentration at low solvent-peanut ratios but not at high levels. Also, the amount of extracted B₁ increased with solvent-peanut levels at all methanol levels. JVS

PECAN

- 1864 FORBUS (WR) Jr., SENTER (SD) and WILSON (RL). Cultivar, processing, and storage effects on pecan kernel colour. *J. Food Sci.* 48(6); 1983; 1646-9
- Two cultivars, (Cheyenne and Wichita) of pecan kernels were processed by three methods (chlorine soak, hot water and steam) and stored for 15 week at 21 C and 65% RH. There were significant differences between cultivars and treatments after processing and storage. Hot water and steam treatment gave darker and redder colour as also different storage periods in both cultivars, as compared to chlorine soak method. MVG

TUBERS AND VEGETABLES

- 1865 COSTILOW (RN) and GERHARDT (P). Dialysis pure-culture process for lactic acid fermentation of vegetables. *J. Food Sci.* 48(6); 1983; 1632-6
- The feasibility of applying a dialysis pure-culture process for lactic acid fermentation was studied with positive results. By proper selection of the culture and with buffering, high populations of viable cells can be obtained and a single culture can be used successively to ferment a number of vegetable lots to obtain high quality products. MVG

CHIVE

- 1866 HASHIMOTO (S), MIYAZAWA (M) and KAMEOKA (H). Volatile flavour components of chive (*Allium schoenoprasum* L.). *J. Food Sci.* 48(6); 1983; 1858-9, 1873
- Using well-established techniques, a sample was obtained of the steam volatile oil of chive (*Allium schoenoprasum* L.). A total of 30 components were identified and the neutral oil contained mainly sulphur compounds (16.8%). The most important constituents are dipropyl disulphide, methyl pentyl disulphide, pentyl hydrodisulphide and (*cis* and *trans*) 3,5-diethyl-2,4-trithiolane. Methyl pentyl disulphide and pentyl hydrodisulphide have not been described previously. AA

CARROT

- 1867 VIJAY SETHI and ANAND (JC). Retention of nutrients in carrots and amla preserves. *Indian Food Packer.* 37(6); 1983; 64-7
- Retention of β -carotene in carrot (i) preserve was 73.7%, while tannin and vitamin C were retained at 25.38 and 59.20% in (ii) amla preserve. During blanching, loss of β -carotene in (i) was 1.08%, while it was 25.4% of vitamin C and 20.4% tannins in (ii). It was observed that 48.83% of vitamin

C and 18.5% tannins got leached into the syrup. It is suggested that a minimum consumption of 50 g of (i) and 100 g of (ii) preserve would help meet dietary requirement of the two vitamins. BSN

POTATO

- 1868 KEMPF (W). Some current problems of potato processing, with starch production as an example. *Getreide Mehl Brot*. 37(5); 1983; 131-7 (German)
- The W. German Ministry for Food, Agriculture, and Forestry has taken up four projects - on potato starch, potato proteins potatopulp, and potato saccharification - to find substitutes from renewable sources, for products that at present are being made from petroleum. The objective of two of these projects is to use fractionated and modified starches as industrial raw materials for further processing by immobilized enzyme systems. The objective of the other two projects is to find uses for the by-products resulting from manufacture of starch and starch derivatives, and the saccharification of starch. KMD
- 1869 MISHKIN (M), SAGUY (I) and KAREL (M). Dynamic optimization of dehydration processes: Minimizing browning in dehydration of potatoes. *J. Food Sci.* 48(6); 1983; 1617-21
- A simulated-optimisation procedure was used to determine optimal drying schemes for minimising browning during dehydration of white potatoes, optimisation results implied that browning was best reduced by not over drying the product and by reducing the temperatures in the latter stages of drying, especially when the average content was in the range 0.1-0.2 g/g solids. Increase in the duration of the drying process also reduced browning as it lowered air temperatures throughout the drying process. MVG
- 1870 PONNAMPALAM (R) and MONDY (NI). Effect of baking and frying on nutritive value of potatoes. Nitrogenous compounds. *J. Food Sci.* 48(6); 1983; 1613-6
- Effects of conventional baking and frying on the contents of nitrogenous constituents in different sections including potato skins were investigated in 3 potato varieties (Katahdin, Chipbelle and Rosa). The compositional changes due to cooking and baking resulted in a significant reduction of total nitrogen and amino acids of cortex and pith tissues. These changes were attributed to possibly the migration of some nitrogenous constituents from cortex to pith tissues during baking. Greater losses of nitrogenous constituents were obtained by frying than baking. However, there were wide differences in total and nonprotein nitrogen among different varieties. MVG
- 1871 NARA (S), SAKAKURA (M) and KOMIYA (T). On the acid resistance of starch granules. *Starch*. 35(8); 1983; 266-70
- When potato starch was hydrolyzed to form Nageli amylopectin by 16% sulphuric acid, at 30 C, only the amorphous portion of the starch granules was deteriorated. The crystallinity of Nageli amylopectin showing the hydrolysis ratio of 0.22 was 1.28 times as large as that of original starch. The hydrolysis process at about 45 C was given by two exponential equations. The value of acid resistance portion (C_0) at 30 and 38 C was 100%, while the values at 45, 50 and 55 C were 67, 38 and 18%, respectively. The high value of C_0 generally showed the high acid resistance in the various starches. Sweet potato and waxy rice starches were more easily hydrolyzed than other starches, although they gave the relatively high value of C_0 . Thus, it was

slightly more difficult for low acid resistant portion of potato starch to be hydrolyzed than for that of other starches. AA

- 1872 SNYDER (PO), MATTHEWS (ME) and MARTH (EH). Fate of *Bacillus cereus* in whipped potatoes during pre-service holding as could occur in a conventional food-service system. *J. Food Prot.* 46(5); 1983; 408-11

Dehydrated potatoes were reconstituted (50 1/2-cup servings), mixed, transferred to a pan and the surface was inoculated with spores of *Bacillus cereus* to give ≥ 40 colony forming units (CFU) per 20.3 cm². Survival of the organism was determined following pre-service holding, (52 C; 32% relative humidity; 1 hour) as could occur in a conventional foodservice system. No statistically significant differences were found in numbers of *B. cereus* before and after pre-service holding. Although the mean surface temperature (56 C) of whipped potatoes was below the maximum germination temperature of *B. cereus* (59 C), mean internal temperature (63 C) and surface temperature (56 C) of whipped potatoes were never low enough for growth of vegetative cells to occur. AA

- 1873 MIN (DB) and SCHWEIZER (DQ). Lipid oxidation in potato chips. *J. Am. Oil Chem. Soc.* 60(9); 1983; 1662-5

Qualitative and quantitative analyses of volatile compounds in fresh and aged potato chips and unused fresh and aged frying oils showed that oxidation of oils was mainly responsible for volatile compound changes in potato chips during storage. The lipid oxidation of potato chips was determined by measuring the peroxide value of potato chips and the amount of volatile compounds and oxygen content in the headspace of potato chip bottles by gas chromatography. The correlation coefficients between volatile compounds and oxygen content, volatile compounds and peroxide value, and peroxide values and oxygen content were -0.93, 0.95 and -0.93, respectively. These high correlation coefficients indicated that volatile compound changes in potato chips during storage were mainly due to the oxidation of oil. The lipid oxidation of potato chips during storage can be studied by measuring oxygen content and the amount of volatile flavour compounds in the headspace. The potato chips produced in oil containing an antioxidant tertiarybutyl hydroquinone (TBHQ) had better oxidation stability than the chips fried in oil without TBHQ. AA

SWEET POTATO

- 1874 HARALAMPU (SG) and KAREL (M). Kinetic models for moisture dependence of ascorbic acid and β -carotene degradation in dehydrated sweet potato. *J. Food Sci.* 48(6); 1983; 1872-3

CYPERUS ESCULENTUS

- 1875 SCHWARTZ (M), COSTELL (E) and GASQUE (F). Rheological behaviour of the beverage, "horchata", made from "chufa" (*Cyperus esculentus* L.). *Rev. Agroquim. Tecnol. Aliment.* 23(2); 1983; 227-36 (Spanish).

The plant *Cyperus esculentus* L. produces small tubers called "chufa" in Spain. From these tubers a refreshing beverage called "horchata" has been prepared. The latter looks like milk, and contains, principally, suspended starch, emulsified fat, and sugar which is added to improve the taste.

The rheological behaviour of two "chufa" extracts with different solid contents (10% and 28% total solids) has been characterized, and the effect of the two most important constituents, fat and starch, has been studied. Starch appears to make a greater contribution to the viscosity than fat. MVG

- 1876 SCHWARTZ (M) and GASQUE (F). Colour measurement of the extracts of *Cyperus esculentus*, L tubers and of the turbidity of its serum. *Rev. Agroquim. Tecnol. Aliment.* 23(2); 1983; 281-6 (Spanish)

Colour and turbidity measurements of the extract of *Cyperus esculentus* L. tubers ("horchata") offer certain difficulties. It is shown that colour of this beverage can be measured satisfactorily in a colorimeter (Hunter Colour Difference) with a liquid thin layer equal to or higher than 15 mm (critical thickness). The turbidity of horchata serum was determined by reflectometry and by spectrophotometry. The reflectometric method consists in measuring L, against a white background, at 5 and 25 mm layer thicknesses and the turbidity is expressed as ΔL . From Kubelka-Munk equations other turbidity parameters were estimated: internal transmission. Ti: opacity, Op: total scattering, SX: total absorption, KX. Spectrophotometric determinations were made at 205 nm. ΔL and absorbance at 205 nm have been selected as methods for the turbidity evaluation of the products studied. These methods are simple and do not need further calculation. AA

CABBAGE

- 1877 McLELLAN (KM) and ROBINSON (DS). Cabbage and brussels sprout peroxidase isoenzymes separated by isoelectric focussing. *Phytochemistry.* 22(3); 1983; 645-7

PARSLEY

- 1878 BERSSET (C) and CANIAUX (P). Relationship between colour evaluation and chlorophyllian pigment content in dried parsley leaves. *J. Food Sci.* 48(6); 1983; 1854-7, 1877

BROCCOLI

- 1879 SHEWFELT (RL), BATAL (KM) and HEATON (EK). Broccoli storage: Effect of N⁶-benzyladenine, packaging and icing on colour of fresh broccoli. *J. Food Sci.* 48(6); 1983; 1594-7

N⁶-benzyladenine (BA) as preharvest spray or postharvest dip improved shelflife in some cans. Preharvest treatment improved colour retention in iced and packed samples. However, use of a yellow-resistant variety and storage treatments (icing and packages) were the most important factors in improving shelflife. MVG

TOMATO

- 1880 MONTVILLE (TJ), CONWAY (LK) and SAPERS (GM). Inherent variability in the efficacy of the USDA raw-pack process for home-canned tomatoes. *J. Food Sci.* 48(6); 1983; 1591-3, 1597

Bacillus licheniformis spores were used as target organism to study USDA raw-pack process for home canned tomatoes. Water bath size and canning load did not affect heat penetration rates in fruit jars of tomatoes. However, the maximum cold-spot temperature was lowered and the calculated process lethalties were lessened due to decreases in water bath size and canning load shortened the come up time. Proper execution of canning runs which varied in water bath size, amount of water in the bath, and load size could produce calculated lethalties ranging between 1 and 7 log reduction. MVG

- 1881 LATLIEF (SJ) and KNORR (D). Tomato seed protein concentrates: effects of methods of recovery upon yield and compositional characteristics. *J. Food Sci.* 48(6); 1983; 1583-6

The methods tried were alkaline extraction and use of three different protein coagulants (citric acid, citric acid/hydrochloric acid mixture or hydrochloric acid) at three coagulation temperatures (25 C, 60 C, 95 C). No significant effect of coagulant as protein yields was evident, but samples coagulated at 25 C had better yield than when heat was applied. Moisture, crude fat and ash concentration was lower in with room temperature coagulation than heat coagulation. Recovery methods did not significantly affect protein content of protein concentrate. However, crude protein values after coagulation with citric acid were higher with coagulation at 25 C than at 95 C. MVG

- 1882 LATLIEF (SJ) and KNORR (D). Effect of chitin as coagulating aid on protein yield, composition and functionality of tomato seed protein concentrates. *J. Food Sci.* 48(6); 1983; 1587-90

Chitin addition increased protein yield, but did not affect emulsion properties. Protein concentrates coagulated at ambient conditions exhibited emulsion properties similar to those of some commercial emulsifiers. The data also shows the composites of effect of processing on protein yield, composition and functionality of protein concentrates and help to develop useful models to tailor functional proteins from food process wastes. MVG

OKRA

- 1883 KALRA (CL), RAINA (BL), TEOTIA (MS), PRUTHI (JS), SHARMA (BR) and NANDPURI (KS). The influence of varieties on the quality of dehydrated okra (*Hibiscus esculentus* L.). *Indian Food Packer.* 37(6); 1983; 47-55

Six varieties of okra (*Hibiscus esculentus*) (L-Sel-1 (i); PS (SLG-7 Diary), (ii); Vashali Vadhu (iii); Pusa Sawani (iv), Sel-2 (v) and Crimson Red (vi)) grown in Ludhiana, Punjab, India, were evaluated for their physico chemical characteristics with a view to assess them for quality of their dehydrated products. The ascorbic acid and protein contents ranged from 17.2-46.6 mg/100 g and 9.9-21.0% respectively. By blanching okra pieces in simmering solution of 2% sodium carbonate at 78 C for 5 minutes. colour of dehydrated product may be improved. Based on data obtained for retention of colour, texture, taste, flavour, dehydration and rehydration ratio, (iii) was found to be the most suitable variety for dehydration. BSN

- 1884 KAPUR (KL), VERMA (RA) and TRIPATHI (MP). Effect of maturity and processing on canned okra *Abelmoschus esculentus*. *Indian Food Packer.* 37(6); 1983; 68-72

The effect of different degrees of maturity as assessed by the length

of pods (4.0-6.0 cm (i); 6.1-8.0 cm (ii), 8.1-10.0 cm (iii) and 10.0 cm and above) and of two processing treatments, canned with brine containing 2% salt and 0.1 citric acid (a) or 2% salt and 0.25% citric acid (b) was examined for assessing the quality of canned okra pods. Based on data obtained for tenderness, mucilage, aroma, colour, taste and seediness, okra pods of size (i) was found to yield the best product, while (b) treatment and processing at 100 ± 1 C for 30 minutes was found to retain quality of the product satisfactorily. BSN

FRUITS

- 1885 ACHINEWHU (SC). Ascorbic acid content of some Nigerian local fruits and vegetables. *Qualitas Plantarum*. 33(4); 1983; 261-6
- Ascorbic acid values of Nigerian fruits ranged from 21.8-98.0 mg/100 g, while that of vegetables was from 21.3-98.8 mg/100 g. Traditional processing of vegetables and fruits resulted in ascorbic acid losses between 32 to 68% and 43 and 58% respectively. When stored in shade (27 C) for four hours, losses ranged from 22 to 34%. Higher amounts of ascorbic acid were present in mango peel and apple peel as compared to their edible portion. BSN
- 1886 KUPCHELLA (L) and SYTY (A). Determination of cyanogenic glycoside in seeds by molecular absorption spectrometry in the gas phase. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 188-191
- As a means of evaluating cyanogenic glycoside content, cyanide was determined in apple, cherry, almond, and peach seeds. Sample preparation involved enzymatic hydrolysis and collection of hydrogen cyanide in strong base. For analysis, cyanide was converted to ammonium by addition of excess KMnO_4 followed by treatment with H_2SO_4 , and the resulting NH_4^+ was determined by the novel gas-phase molecular absorption spectrometric technique. An atomic absorption spectrophotometer, with a flow-through absorption cell replacing the flame, was used in the analysis. Recovery of amygdalin was $98.4 \pm 1.2\%$ complete. Cyanogenic glycoside contents determined in seeds (0.93% for apple, 2.05% for cherry, 2.43% for peach, and 0.00% for almond, reported in terms of amygdalin), were confirmed by a standard titration method. The lowest detectable concentration was $0.2 \mu\text{g NH}_4^+/\text{mL}$, which corresponds to a detection limit of 0.5 mg amygdalin in the seed sample. AA

BLUEBERRY

- 1887 SALTVEIT (ME) Jr. and BALLINGER (WE). Effects of anaerobic nitrogen and carbon dioxide atmospheres on ethanol production and postharvest quality of blueberries. *J. Am. Soc. Hortic. Sci.* 108(3); 1983; 459-62
- 1888 BUSHWAY (RJ), McGANN (DF), COOK (WP), and BUSHWAY (AA). Mineral and vitamin content of low bush blueberries (*Vaccinium angustifolium* Ait.). *J. Food Sci.* 48(6); 1983; 1878, 1880

STRAWBERRY

- 1889 SISTRUNK (WA), WANG (RC) and MORRIS (JR). Effect of combining mechanically harvested green and ripe puree and sliced fruit, processing methodology and frozen storage on quality of strawberries. *J. Food Sci.* 48(6); 1983; 1609-12, 1616

Addition of green and ripe fruit puree to sliced strawberries gave higher viscosity and lower ascorbic acid, total anthocyanins and red colour as compared with 100% sliced ripe fruit. A sensory panel rated the mixtures of sliced ripe fruit and upto 40 per cent puree as acceptable. During long term storage, heating the puree was beneficial to colour. Holding fresh fruits for 24 hours at 24 C after cleaning decreased ascorbic acid, viscosity of syrup and colour of the frozen pack. Ascorbic acid and colour decreased in the frozen product on storage. MVG

GRAPE

- 1890 FREEMAN (BM) and KLIWER (WM). Effect of irrigation, crop level and potassium fertilization on carignane vines. II. grape and wine quality. *Am. J. Enol. Vitic.* 34(3); 1983; 197-207

Frequent irrigation reduced soluble solids in grapes, whereas pH and K concentrations increased by irrigation of vines treated by 0 and 2.2 Kg potassium sulphate per vine per year. The rate of K concentration in berry juice with increasing soluble solids followed a sigmoidal pattern. Accumulation of K was rapid till fruit attained about 10 Brix, which later turned slow upto 17°Brix and reached a second stage of increase till fruit ripening. Amounts of arginine and proline in berry juice were less in non-irrigated than in irrigated berries on a given date. BSN

- 1891 SALTVEIT (ME) Jr. and BALLINGER (WE). Effects of anaerobic nitrogen and carbon dioxide atmosphere on ethanol production and post-harvest quality of 'Carlos' grapes. *J. Am. Soc. Hortic. Sci.* 108(3); 1983; 462-5

- 1892 SAPI (JC), MacHEIX (JJ) and CORDONNIER (R). The browning capacity of grapes. II. Browning potential and polyphenol oxidase activities in different mature grape varieties. *Am. J. Enol. Vitic.* 34(3); 1983; 157-62

Polyphenol oxidase of grape is a strongly bound enzyme and browning is concentrated to a large extent in soluble portions of the grape juice. The limiting factor in browning appears to be the phenolic substrate. BSN

- 1893 TAKEDA (F), SAUNDERS (MS) and SAUNDERS (JA). Physical and chemical changes in muscadine grapes during post-harvest storage. *Am. J. Enol. Vitic.* 34(3); 1983; 180-85

- 1894 PEARSON (RC) and RIEGEL (DG). Control of botrytis bunch rot of ripening grapes: Timing applications of the dicarboximide fungicides. *Am. J. Enol. Vitic.* 34(3); 1983; 167-72

- 1895 McDONALD (G), BUCHANAN (GA) and GRIFFITHS (GR). Insecticide application and degradation in Sultana grapes grown for drying. *Pestic. Sci.* 14(5); 1983; 528-36

Malathion and chlorpyrifos were sprayed on mature, unharvested and harvested Sultana grapes. Unharvested bunches retained 3.5-8.1% of the

active ingredient whereas harvested bunches laid out to dry retained 23% active ingredient. Rate of loss of insecticide was accelerated by the addition of alkaline drying oils. Processing and storage did not alter the residues. KAR

- 1896 CALLANDER (JF). Effect of grape maturity on the composition and quality of Ohio Vidal blanc Vines. *Am. J. Enol. Vitic.* 34(3); 1983; 139-41
 A two year study to determine effect of grape maturity on vidal blanc wines showed that Brix values at early, mid and late stages of maturity for both seasons ranged between 15.8 and 21.8 C. With an increase in grape maturity, total acidity, tartrates and malates decreased, whereas pH, tannin and colour increased. Intermediate maturity grapes showed highest quality of aroma and taste as indicated by sensory studies. BSN
- 1897 ARCHER (TE), STOKES (JD), JOHNSON (JO), MENDIVIL (S), NEJA (R), HARDIE (WJ) and WEAVER (RJ). Naphthaleneacetic acid and its major conjugate residues in Zinfandel grapes and wine. *Am. J. Enol. Vitic.* 34(3); 1983; 163-6
 The NAA (1-naphthaleneacetic acid) treated grapes (at the rate of 100 mg/L (i) and 200 mg/L (ii)) on grape vines) when processed into juice and wine, showed residues of 0.12 and 0.21, 0.07 and 0.12, 0.12 and 0.24 and 0.07 and 0.12 ppm for crushed grapes, pressed juice, pressed pomace and bottled wine for (i) and (ii) respectively. BSN

CITRUS

- 1898 OKADA (N), OHTA (T) and EBINE (H). Production of microbial biomass product from citrus peels by solid fermentation. *Rep. Nat. Food Res. Inst.* 58(2); 1983; 9-13 (Japanese)
 To 100 parts of citrus peel was added 5 parts of ammonium sulphate, 2 parts of urea and 1 part of potassium phosphate to stimulate the growth of *Aspergillus oryzae* for the production of protein. The yield of crude protein increased from 4 to 14% but the dry weight of citrus peel decreased from 100 to 65 g in three days incubation time. KAR

KUMQUAT

- 1899 KOYASAKO (A) and BERNHARD (RA). Volatile constituents of the essential oil of kumquat. *J. Food Sci.* 48(6); 1983; 1807-12
 In this study 120 compounds were found and 71 volatile compounds were identified in the essential oil of kumquat. A simultaneous distillation/extraction technique was used to obtain the essential oil from the fruit. Individual compounds were identified by means of Kovats retention indices on polar and nonpolar columns and mass spectral data. Some 13 sesquiterpenes, 8 terpenes, 11 alcohols, 1 ketone, 8 aldehydes and 13 esters were identified in kumquat oil for the first time. Limonene was the most abundant compound comprising 93% of the whole oil. AA

MANDARIN

- 1900 BEERH (OP) and RANE (VR). Canning of mandarin orange segments. *Indian Food Packer.* 37(6); 1983; 25-42

Ambia (i) and Mrug Bahar (ii) varieties of mandarin oranges (*Citrus reticulata*) grown in Nagpur region, Maharashtra, India, were canned using different amounts of fill-in-weight of segments and covering sugar syrup. It was found that drained weight was directly proportional to fill-in-weight of segments and inversely proportional to the strength of the covering syrup. In case of cut-out syrup brix, it was observed to be the reverse case. (ii) gave higher drained weight, cut-out syrup brix, more breakage in canned segments than (i). However, colour retention was more in (ii) as compared to (i). Ascorbic acid was 23.46% during canning, while it got reduced by 35-40% on storage for 10 months. Texture of segments was preserved better with covering syrup of 20-30° brix. The product was, however, rated very poor by organoleptic evaluation. BSN

MANGO

- 1901 KALRA (SK) and TANDON (DK). Salt-treated raw mango slices in polyethylene pouches. *Indian Food Packer*. 37(6); 1983; 101-7

Raw mango slices were treated with powdered salt, saturated and half saturated brine solution with or without SO₂ treatment and were stored in low density polyethylene pouches. Combined SO₂ and powdered salt treatment could preserve the slices for over three months and only SO₂ for seventy days only. In most of the treatments, total soluble carbohydrates increased about 3 times during storage but reducing sugars showed slight upward trend. Acidity declined during first week of storage and later on, it was more or less consistent. AA

PEACH

- 1902 O'MAHONY (M), BUTEAU (L), KLAPMAN-BAKER (K), STAVROS (I), ALFORD (J), LEONARD (SJ), HEIL (JR) and WOLCOTT (TK). Sensory evaluation of high vacuum flame sterilized clingstone peaches, using ranking and signal detection measures with minimal cross-sensory interference. *J. Food Sci.* 48(6); 1983; 1626-31

Differences due to conventional and HVFS canning treatments for seven peach varieties have been studied by sensory evaluation technique using a ranking procedure to give mean rank and R-index of degree of difference on the parameters, odour, intensity, sweetners, sourness, firmness by bite and visual appearance of firmness and colour. MVG

AVOCADO

- 1903 SHARON-RABER (O) and KAHN (V). Avocado mesocarp, browning potential, carotenoid content, polyphenol oxidase, catalase and peroxidase activities: Comparison between six avocado cultivars. *J. Food Sci.* 48(6); 1983; 1874-5

Enzymatic activities (polyphenoloxidase, catalase and peroxidase) and carotenoid content were estimated in the yellow portion of the mesocarp of six avocado cultivars differing in their browning potential. The results do not support our assumption of the existence of an inverse relationship between browning potential and carotenoid content in the tissue. AA

APPLE

- 1904 SATJAWATCHARAPHONG (C), RYMAL (KS), DOZIER (WA) Jr. and SMITH (RC). Polyphenol oxidase system in Red Delicious apples. *J. Food Sci.* 48(6); 1983; 1879-80

Two active isoenzymes were detected with-pyrocatechol substrate by polyacrylamide electrophoresis (PAGE). The crude enzyme extract had one optimum pH of 6.2 and one optimum temperature of 30 C for browning reaction. The average Michaelis constant (Km) of the two active enzymes was 2.2×10^{-1} M pyrocatechol and average mean velocity (Vmax) was 4.8×10^{-1} ΔA_{390} per minute. MVG

- 1905 PUDIL (F), VIDEN (I), VELISEK (J) and DAVIDEK (J). The volatile components of an industrial apple aroma concentrate. *Z. Lebensmittel-unters. Forsch.* 177(3); 1983; 181-5

Acidic and neutral fractions of the apple aroma concentrate were analysed using GLC or GLC-MS: 42 components, of which nine were determined only tentatively, were identified. The mass-spectra of hexenyl esters and hexenoates, part of which has been found in apples and their processed products for the first time, are discussed. AA

- 1906 KRISHNA PRAKASH (MS), HABIBUNNISA, ARVINDA PRASAD (B), NARASIMHAM (P), DHANRAJ (S), ANANTHAKRISHNA (SM) and GOVINDARAJAN (VS). Pre-harvest and post-harvest applications of Benlate on control of fungal infections in Golden Delicious apples of Himachal Pradesh. *Indian Food Packer.* 37(6); 1983; 91-100

The effects of pre-harvest and post-harvest applications of benlate on the control of field fungal infections like sooty blotch and flyspeck and storage fungal spot disease of Golden Delicious apples are given in this paper. Pre-harvest spray of benlate at 100, 500 and 1000 mg/h concentration to Golden Delicious trees at 5, 3 and 1 weeks prior to harvest effectively controlled the field fungal infections at all the concentrations. Further, higher the concentration of Benlate, lesser were the fungal spots on subsequent fruit storage. Post-harvest dip treatments of apples with benlate alone at 1000 mg/hour in water and with Waxol-O emulsion, the latter was more effective. Apples receiving both a pre-harvest treatment at 100 mg/L of benlate and a post-harvest dip treatment with Waxol-O containing 1000 mg/L of benlate showed better control of fungal diseases during storage than post-harvest benlate treatment in Waxol-O alone. AA

AONLA PRESERVE

- 1907 JAIN (SP), TRIPATHI (VK), RAM (HB) and SURJEET SINGH. Optimum stage of maturity for preparation of Aonla (*Emblia officinalis* Gaerth) preserve Part II. *Indian Food Packer.* 37(6); 1983; 85-90

An experiment was designed to assess the effect of maturity on the quality of aonla (*Emblia officinalis* Gaerth) preserve. Observations on quality assessment revealed that the colour, texture, taste and overall quality of product were positively associated with the stage of maturity. Period extending from the second week of December to the third week of January appears to be the optimum stage of harvesting for the preparation of aonla preserve of high nutritional quality. However, fruits harvested in the last week of December gave preserve of significantly superior quality. AA

CHINESE TALLOW FRUIT

- 1908 ECHOLS (RE). Weathering effects on Chinese tallow fruit lipid content. *J. Am. Oil Chem. Soc.* 60(1); 1983; 90

SUGAR, STARCH AND CONFECTIONERY

- 1909 SMITH (DE) and WINDER (WC). Effects of temperature, concentration and solute structure on the acoustic properties of monosaccharide solutions. *J. Food Sci.* 48(6); 1983; 1822-5
- 1910 RAMADAS BHAT (U), PARAMAHANS (SV) and THARANATHAN (RN). Scanning electron microscopy of enzyme-digested starch granules. *Starch.* 35(8); 1983; 261-5
The study deals with comparison of the susceptibility to fungal glucoamylase and salivary α -amylase of starch granules from *navane*, *panivaragu*, black pepper and black gram. The crude glucoamylase was purified by fractionation and column chromatography to give two pure fractions of which one was used. The rate of amylolysis was followed by estimating the amount of glucose and maltose released. The type and extent of damage of the starch granules were observed by scanning electron microscopy which revealed characteristic degradation patterns in *navane* and *panivaragu* whereas black gram granules were resistant to the attack. Very small-sized black pepper starch granules did not exhibit any obvious signs of amyolytic attack. AA
- 1911 MAHER (GG). Alkali gelatinization of flours. *Starch.* 35(8); 1983; 271-6
Flours from 12 different species of grain, pod seed, and tuber plants were gelatinized with aqueous sodium hydroxide at room temperature. Changes in physical appearances and viscosity patterns were noted over a 7-day quiescent period in graded-strength alkali solutions in sealed jars. The alkali strength, 0.07-0.85-N, was sufficient to peptize proteins and hemicelluloses. Colour development was strong and rapid and several flours evolved notable amounts of ammonia and perhaps amines. No two flours produced the same viscosity development patterns as time progressed. From the observed visual and viscosity changes, it was apparent that alkali gelatinization of the flours generally was complete within several hours at levels of 2.82-3.52 meq NaOH/g flours. Some discussion centres on differences between flours, between some species of flours and the starches obtained from those species, and the possible role of other flour constituents on the gelatinization behaviour. AA

CONFECTIONERY

- 1912 ANON. Micro-computers in confectionery research and formulation. *Manuf. Confect.* 63(2); 1983; 45-9

CHOCOLATE

- 1913 POWELL (BD). The chocolate and sugar confectionery industry. *Manuf. Confect.* 63(2); 1983; 31-5

- 1914 SPENCER (UM). Chocolate, sugar confectionery and biscuit consumption. *Manuf. Confect.* 63(2); 1983; 38-42
- 1915 CRESPO (S), MARTIN (K) and SCHWARTZ (R). Must sodium or potassium be added to chocolate and other coatings? *Manuf. Confect.* 63(3); 1983; 61-2

BAKERY PRODUCTS

BREAD

- 1916 BANECKI (H). Moisture content of starch and gluten in the bread crumb. *Getreide Mehl Brot.* 37(5); 1983; 153-5 (German)

A model layer-packet was used to determine the moisture content in the starch layer and the gluten layer respectively. When the proportion of starch to gluten in the model was the same as that in bread crumb, then more moisture was found in the starch layer than in the gluten layer. This result contradicts the findings of earlier experiments by other research workers. No displacement of moisture from the starch to the gluten could be observed during the first 72 hour after baking; hence, moisture displacement does not have any influence on the staling of bread. Varying the moisture content of starch from 14 to 38% prior to baking, did not result in any change in the difference between the moisture contents of starch and gluten after baking. KMD

- 1917 RUSSELL (PL). A kinetic study of bread staling by differential scanning calorimetry. The effect of painting loaves with ethanol. *Starch.* 35(8); 1983; 277-81

Differential-scanning calorimetry (DSC) has been used to follow changes in the rate of development of an endotherm associated with the starch fraction of bread during ageing, as a result of ethanol treatment. Treatment consisted in painting the surface of loaves with ethanol after they have been baked and allowed to cool. DSC data were fitted to Avrami equations. The rate of development of the "Staling endotherm" was lower for bread treated with alcohol than for untreated controls. For comparison, crumb compressibility measurements were made. It could be concluded that painting loaves with ethanol led to a reduction in the rate of increase of crumb modulus with storage time. The site of action of the alcohol remains to be established, although one possibility could be the amylose. AA

- 1918 SCHIEBERLE (P) and GROSCH (W). Identification of flavour compounds from the crust of rye bread. *Z. Lebensmittel-Unters Forsch.* 177(3); 1983; 173-80 (German)

The crust of freshly baked rye bread was extracted with methylene chloride. The volatile components in the extract, which showed a strong "crusty-caramel-like" odour, were isolated by vacuum sublimation and fractionated by column and high pressure liquid chromatography. By using simultaneous gc-analysis/sensory evaluation of each fraction components showing a distinct odour could be analysed by mass spectrometry and identified by comparison with authentic compounds. Among the 39 flavour compounds identified, 2-acetylpyrazine, 2-methyl-3-ethyl-pyrazine, 6,7-dihydro-5-methyl(5H)-cyclopentapyrazine, 2-acetyl-1,4,5,6-tetrahydropyridine and 2-acetylpyridine were responsible for the crusty aroma notes and 2-methyl-3-hydroxy-pyran-4-one (maltol) and 2-acetyl-3-hydroxyfuran (isomaltol) for the caramel odours. AA

- 1919 FARIDI (HA), FINNEY (PL) and RUBENTHALER (GL). Effect of soda leavening on phytic acid content and physical characteristics of Middle Eastern Breads. *J. Food Sci.* 48(6); 1983; 1654-8

PASTA

- 1920 MCGEE (B) and GILES (J). Semolina: Food for thought. *Mill. Feed Farm Supplies.* 166(4); 1983; 44-47

SPAGETTI

- 1921 CREMER (ML). Sensory quality of spaghetti with meat sauce after varying holding treatments and heating in institutional microwave and convection ovens. *J. Food Sci.* 48(6); 1983; 1579-82

Sensory quality of spaghetti after heating in microwave and convection ovens to ensure microbiological safety was investigated after (a) 1 hour chilled storage (1 C), (b) 24 hours chilled storage (24 C) (c) 24 hours frozen storage (24 F), (d) 24 hours frozen storage followed by 24 hours chilled storage (24 F/24 C), and (e) after no storage and reheating. Samples at (a) or (b) had better scores than those at (c) and (d). Spaghetti treated in the microwave had greater fat separation, clumping, greasiness, firmness and chewiness as compared to those heated by convection. MVG

SAVOURY FOOD

- 1922 PRUTHI (JS), KALRA (CL), MANAN (JK) and RAINA (BL). The manufacture, packaging and storage of traditional savoury foods. Part II. Phul wadian, Mukand wadian and other savoury foods. *Indian Food Packer.* 37(6); 1983; 73-84

Optimum conditions for manufacture and for improvement in the packaging and storage of Phul wadian, Mukand wadian and other savoury foods (deep fat-fried, salted and spiced) have been determined. Studies on the physico-chemical characteristics of Phul wadian, Mukand wadian and other savoury foods revealed that Phul wadian was a poor source of protein and Mukand wadian a fair source of protein. Both were rich in carbohydrates, while deep-fat-fried savoury foods were good source of protein. Sorption-isotherm studies of these important classes of savoury foods revealed that equilibrium, relative humidity (ERH) of Phul wadian and Mukand wadian was found to be 53.0 and 57.0% respectively, while that of deep fat fried, salted and spiced green gram dhal, Bengal gram dal, Masoor, while Bengal gram (whole), Baisan-savian and mixed Namkin (chochow) was found to be 50.0, 47.0, 46.0, 44.0, 40.0 and 42.0% respectively. AA

MILK AND DAIRY PRODUCTS

- 1923 BASSETTE (R), FUNG (DYC) and ROBERTS (H). Effect of pasteurization temperature on susceptibility of milk to light-induced flavour. *J. Food Prot.* 46(5); 1983; 416-9
- 1924 MIKOLAJCIK (EM) and BRUCKER (RB). Limulus amebocyte lysate assay. A rapid test for the assessment of raw and pasteurized milk quality. *Dairy Food Sanitation* 3(4); 1984; 129-31

- 1925 KIRST (E) and HANSEN (R). Lipolytic processes in milk and dairy products. Part 5. Aptitude of individual parameters for the valuation of lipolytic changes in raw milk. *Lebensmittelindustrie*. 30(2); 1983; 77-82 (German)
- The lipolytic processes that can occur in milk and milk products have been described, and investigations on influencing the lipolytic sensitivity (proneness to lipolysis) of milk by thermal and low-mechanical factors have been reported. Comparative tests have been undertaken to establish those parameters which are suitable for the control of lipolytic alterations in milk. It was found that the content of "free fat, and of free fatty acids would suffice for the estimation of the lipolytic changes in milk fat. KMD
- 1926 CHURCH (FC), SWAISGOOD (HE), PORTER (DH) and CATIGNANI (GL). Spectrophotometric assay using O-phthaldialdehyde for determination of proteolysis in milk and isolated milk proteins. *J. Dairy Sci.* 66(6); 1983; 1219-27
- 1927 LONERGAN (DA). Isolation of casein by ultrafiltration and cryodestabilization. *J. Food Sci.* 48(6); 1983; 1817-21, 1825
- Casein was isolated from skim milk by ultrafiltration, storage of the retentate at -8 C for 1-4 week, and centrifuging of thawed samples at 5,000 x g for 10 minutes. The extent of cryodestabilization of casein was dependent on the extent of ultrafiltration and storage time at -8 C. Ultrafiltration to a 4 x or 6 x volume concentration (VCR) ratio resulted in greater than 95% recovery of casein. Casein thus precipitated could be washed with water at 0 C without any significant loss of casein. Removal of lactose caused accelerated casein cryodestabilization in ultrafiltered samples as compared to control samples. Casein precipitated by this method is dispersible in water, whereas acid precipitated casein is not. AA
- 1928 INDYK (H). The routine, simultaneous determination of vitamins A and E in fortified whole milk powders. *NZ. J. Dairy Sci. Technol.* 18(3); 1983; 197-208
- A method has been developed which provides a simple, rapid and accurate simultaneous spectrophotometric estimation of vitamins A and E in fortified whole milk powder products. The results compared favourably with a high performance liquid chromatography reference method. The method is designed for rapid quality control of a particular milk powder product. AA
- 1929 WICKROSKI (AF) and McLEAN (LA). Improved reverse phase liquid chromatographic determination of vitamins A and D in fortified milk. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 62-5
- 1930 EL-GENDY (SM), ABDEL-GALIL (H), SHAHIN (Y) and HEGAZI (FZ). Characteristics of salt-tolerant lactic acid bacteria, in particular lactobacilli, leuconostocs and pediococci, isolated from salted raw milk. *J. Food Prot.* 46(5); 1983; 429-33, 440
- 1931 SHEHATA (AE), MAGDOUB (MNI), SULTAN (NE) and EL-SAMRAGY (YA). Aerobic mesophilic and psychrotrophic sporeforming bacteria in buffalo milk. *J. Dairy Sci.* 66(6); 1983; 1228-31
- 1932 FIRSTENBERG-EDEN (R) and TRICARICO (MK). Impedimetric determination of total, mesophilic and psychrotrophic counts in raw milk. *J. Food Sci.* 48(6); 1983; 1750-54

A rapid impedimetric determination for total, mesophilic and psychrotrophic counts in raw milk showed correlations (between impedance detection times and standard plate counts) of -0.96, -0.95, and 0.96, respectively. Mesophiles were most often seen as the predominant population, the impedimetric method allowed for these samples containing above 1.0×10^5 CFU/ml to be screened out within 4 hour. Psychrotrophic levels of 1×10^5 CFU/ml and above were screened within 21 hours, while total concentration of samples containing above 1×10^5 CFU/ml were screened within 16 hours. AA

- 1933 BURDASPAL (PA), LEGARDA (TMa) and PINILLA (I). Incidence of aflatoxin M_1 contamination in milk. *Rev. Agroquim. Tecnol. Aliment.* 23(2); 1983; 287-90 (Spanish)

Samples of raw, pasteurized, sterilized, and concentrated milk (95 in all) available in Madrid were analyzed. None of them had an aflatoxin M_1 content greater than $0.050 \mu\text{g/l}$; 7 samples had aflatoxin M_1 contents between 0.02 and $0.04 \mu\text{g/l}$. KMD

- 1934 COHEN (H), LAPOINTE (M) and FREMY (JM). Determination of aflatoxin M_1 in milk by liquid chromatography with fluorescence detection. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 49-51

A liquid chromatographic (LC) method is proposed for the determination of aflatoxin M_1 in milk. The method was successfully applied to both liquid whole and skim milk and also whole and skim milk powder. The samples are initially extracted with acetonitrile-water followed by purification using a silica gel cartridge and a C_{18} cartridge. Final analysis by LC was achieved using a radial compression module equipped with a $5 \mu\text{m}$ C_{18} column and a fluorescence detector. The method was successfully applied to samples at levels of 10 to 0.08 ppb added aflatoxin M_1 with recoveries in the range of 70-98%. AA

YOGHURT

- 1935 HITCHINS (AD), McDONOUGH (FE), WONG (NP) and HARGROVE (RE). Biological and biochemical variables affecting the relative values for growth and feed efficiency of rats fed yoghurt or milk. *J. Food Sci.* 48(6); 1983; 1836-40

Stimulation of weanling rat growth by yoghurt and related fermented milks was associated with increased feed efficiency (FE) and increased consumption (C). During the 4-week bioassay the importance of FE in growth stimulation decreased relative to C. The degree of stimulation depended inversely on the growth performance of the control rats. Stimulation was unrelated to the final pH, lactose content, or bacterial lactase content, but was related to the bacterial content. *Lactobacillus bulgaricus* could be omitted from the yoghurt fermentation or replaced by other bacteria without reducing stimulation. Lactase pretreatment of the control milk improved growth performance. AA

BUTTER

- 1936 FARAG (RS), ABO-RAYA (SH), AHMED (FA), HEWEDI (FM) and KHALIFA (HH). Fractional crystallization and gas chromatographic analysis of fatty acids as a means of detecting butterfat adulteration. *J. Am. Oil Chem. Soc.* 60(9); 1983; 1665-9

A method has been devised which gives the distribution of saturated and

unsaturated fatty acids of pure and adulterated cow and buffalo ghee with lard or margarine. It involves fractionation of pure and adulterated butter-fat into fractions by fractional crystallization. The composition of the fatty acids liberated by the hydrolysis of each of the fractions was determined by gas chromatography. Adulteration of cow and buffalo ghee with various levels of lard or margarine caused significant changes in certain fatty acids, i.e., 22:0, 18:1, 18:0 and 16:0. It is possible to determine the extent of admixture of lard or margarine to either cow or buffalo ghee by applying a simple regression equation for certain fatty acids. This technique provides a basis for the detection of lipid adulteration. AA

- 1937 WOO (AH) and LINDSAY (RC). Statistical correlation of quantitative flavour intensity assessments and individual free fatty acid measurements for routine detection and prediction of hydrolytic rancidity off-flavours in butter. *J. Food Sci.* 48(6); 1983; 1761-6, 1771

A method has been developed by correlating quantitative sensory data with individual free fatty acid (FFA) concentrations (ppm) using stepwise regression and discriminant analyses. MVG

CHEESE

- 1938 MERIN (U), GORDIN (S), and TANNY (GB). Microfiltration of cheese brine. *J. Dairy Res.* 50(4); 1983; 503-9

Soft cheese brine with viable counts/ml of up to 1.2×10^6 bacteria and 2.2×10^4 yeasts and moulds was filtered using a pleated tangential flow filtration cartridge of 0.2 μm pore size membrane. This filtration resulted in a 3-4 orders of magnitude reduction of bacteria and the complete rejection of yeast and mould from the permeate. Hard cheese brine with similar bacterial loads was treated with a 1.2 μm pore size membrane cartridge and the resulting permeate contained 2-3 orders of magnitude, fewer bacteria and no yeasts or moulds. Flux decline during the filtration was a function of the number of microorganisms and the amount of N in the brine. A cleaning procedure using enzyme and acid washes was established in order to prolong membrane performance. AA

- 1939 LAWRENCE (RC), GILLES (J) and CREAMER (LK). The relationship between cheese texture and flavour. *NZ J. Dairy Sci. Technol.* 18(3); 1983; 175-90

The review deals with: basic structure of a cheese including a model for the same; factors that modify the basic structure of a cheese like pH, and others; classification of cheese types; the effect of the coagulant on cheese structure and texture; and the relationship between casein degradation, texture and flavour in cheese. KAR

- 1940 MANNING (DJ), RIDOUT (EA), PRICE (JC) and GREGORY (RJ). Effect of reducing the block size on the flavour of cheddar cheese. *J. Dairy Res.* 50(4); 1983; 527-34

Blocks of cheddar cheese ranging in weight from 3/4 to 44 lb were vacuum-wrapped and stored for up to 6 weeks. Panel assessment after 0, 3 and 6 weeks showed that the quality decreased, and off-flavours increased with decrease in block size. Headspace analysis showed that the volatile substances H_2S and CH_3SH decreased in concentration in line with quality. AA

- 1941 KOTULA (KT), NIKAZY (JN), MCGINNIS (N) and BRIGGS (GM). Development of a rat model to test the nutritional equivalency of traditional vs fabricated foods: Cheddar cheese vs fabricated cheddar cheese. *J. Food Sci.* 48(6); 1983; 1674-7, 1704
 A biological assay method was developed to test the "nutritional equivalency" of traditional vs fabricated foods and tested with cheddar cheese and fabricated cheddar cheese. The test could be successfully applied to fabricated foods which are standardised. It would only be necessary to vary the vitamin/mineral mixture according to nutritional equivalency standards being tested. However, with some products longer tests (months or generation) may be necessary as some nutritional deficiencies do not manifest themselves in 4 weeks. MVG
- 1942 GUINEE (TP) and FOX (PF). Sodium chloride and moisture changes in Romano-type cheese during salting. *J. Dairy Res.* 50(4); 1983; 511-8
 The apparent diffusion coefficients for NaCl in Romano-type cheese salted by brining or dry salting were $\sim 0.23 \text{ cm}^2/\text{d}$. A plot of the natural logarithm of % salt-in moisture against distance was almost linear, the slope of which is the distance over which the salt concentration decreases by a factor of $1/e$ (0.368). Such plots may be useful in predicting the concentration of NaCl at any point in the cheese after any period of brining. After 9 day brining, the water to salt flux (ratio of outflow of water to in-flow of NaCl) decreased from 2.42 at the surface to ~ 0.5 in the middle zone of the cheese and increased again to > 1 at greater distances from the cheese/brine interface. AA
- 1943 AHMED (AA-H), MOUSTAFA (MK) and MARTH (EH). Growth and survival of *Staphylococcus aureus* in Egyptian Domiati cheese. *J. Food Prot.* 46(5); 1983; 412-5, 419
- 1944 BENNETT (RW) and AMOS (WT). *Staphylococcus aureus* growth and toxin production in imitation cheeses. *J. Food Sci.* 48(6); 1983; 1670-73
 The study has demonstrated that several imitation cheeses could support the growth of *Staphylococcus aureus* and consequent production of enterotoxins. It was therefore recommended that proper storage conditions should be detailed on the labels of the products. MVG
- 1945 LAW (BA) and WIGMORE (AS). Accelerated ripening of cheddar cheese with a commercial proteinase and intracellular enzymes from starter streptococci. *J. Dairy Res.* 50(4); 1983; 519-25
 Intracellular cell-free enzyme extracts (CFE) of cheese starter bacteria significantly enhanced the flavour-accelerating effect of commercial neutral proteinase without increasing the gross proteolysis in Cheddar cheese. Peptide and amino acid N were released more rapidly in CFE-treated cheeses, compared with those treated with neutral proteinase or untreated controls. AA

ICECREAM

- 1946 BODYFELT (FW). Icecream: What really determines the quality? *Dairy Food Sanitation* 3(4); 1983; 124-8
 Discusses: types of icecream; labeling; marketing strategies; high milk content and icy texture; dairy ingredient; and objective determination of

quality (flavour, sweetness level, body or texture, colour). BSN

- 1947 BODYFELT (FW). Quality assurance for ice cream manufacture. *Dairy Food Sanitation*. 3(5); 1983; 164-70

Discusses: quality; quality control or quality assurance; achievement of high quality; total quality assurance; quality is an ideal; quality assurance task; mandatory elements of quality assurance. A consumers view of quality; factors for determining ice cream quality; cream in ice cream; ice cream ingredients; flavour defects; microbiological and chemical analysis; compositional analysis; quality deterioration due to high temperature fluctuations; and flavour preference surveys. BSN

MEAT AND POULTRY

- 1948 GILL (CO). Meat spoilage and evaluation of the potential storage life of fresh meat. *J. Food Prot.* 46(5); 1983; 444-52

Discusses: spoilage organisms; growth of bacteria on muscle tissue; growth of bacteria in fat tissue; growth of bacteria in minced tissue; aerobic microflora; microflora development in vacuum packages; aerobic spoilage; spoilage in vacuum packages; bacterial cell density; estimation of spoilage products; estimation of other changes in meat composition; aerobic spoilage of mince; aerobic spoilage of whole meat; and vacuum packaged meat. BSN

- 1949 CATALA (R), MONTORO (R) and YBANEZ (N). Contamination of meat products by heavy metals. *Rev. Agroquím. Tecnol. Aliment.* 23(2); 1983; 202-16 (Spanish)

An idea of the extent of lead and cadmium contamination in meat products is given with the help of data collected from published literature. KMD

- 1950 SARKAR (G) and CHAUDHURI (DR). Acid phosphatase as a probe into adulteration in meat (raw). *Indian Food Packer.* 37(6); 1983; 56-9

The enzyme acid phosphatase from the muscle tissue of different species of meat has been found to have different specific activities. When mixed in varying proportions, beef and goat meat mixtures also showed steady differences in the activity of the enzyme which may be utilised for identification of different species of meat. AA

BEEF

- 1951 GOMBOCZ (E) and PETUELY (F). Detection and analysis of cow and pig blood plasma in processed meat products by means of immuno turbidimetry. *Dtsch. Lebensmittel-Rundschau*. 79(5); 1983; 137-56 (German)

- 1952 SORNAY (J) and VALIN (C). Influence of weight, conformation, and state of fattening of large bovine carcasses on their rate of refrigeration. *Ind. Aliment. Agric.* 100(9); 1983; 607-11 (French)

The temperature at any point of a carcass obeys the following law:

$$y = \ln \frac{\theta - \theta_m}{\theta_0 - \theta_m} = -at + b \quad \text{where } a \text{ is a coefficient that characterizes the heat}$$

exchange between the carcass and the cooling medium. From a study of the

refrigeration kinetics at different sites on the carcass, the authors have defined a coefficient S , such that $a = \alpha \cdot S$, which permits one to predict, under known conditions of temperature, and rate of flow of refrigerating air, the temperature at any site on the carcass during refrigeration. KMD

- 1953 LUSBY (ML), RIDPATH (JF), PARRISH (FC) Jr. and ROBSON (RM). Effect of postmortem storage on degradation of the myofibrillar protein titin in bovine Longissimus muscle. *J. Food Sci.* 48(6); 1983; 1787-90, 1795
- 1954 CAREY (AM), ARCHER (JN), PRIORE (JD), KOTULA (AW) Jr., and ACOSTA-STEIN (L). Histologic detection of cardiac musculature, soy flour, and partially defatted tissue in ground beef: Interlaboratory study. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 16-9
Ground beef samples were prepared containing 0,3,5,10, and 15% of each of the 3 adulterants. Five samples of each composition at each of the 5 dilutions, for a total of 75 unknown samples, were analyzed at each of 5 participating laboratories. The study revealed that this technique is reliable for the detection of these adulterants in ground beef. AA
- 1955 BARRERA (M) and ZARITZKY (NE). Thermal conductivity of frozen beef liver. *J. Food Sci.* 48(6); 1983; 1779-82
- 1956 SMITH (GC), PURSER (DE), SAVELL (JW), STIFFLER (DM) and DUTSON (TR). Effect of freezing temperature on weight loss and quality characteristics of beef liver, kidney, heart, and tongue. *J. Food Sci.* 48(6); 1983; 1726-7, 1760
Effects of freezing temperatures on weight loss, colour, appearance, odour or tenderness of variety meats were evaluated during or after thawing and retail display. It was found that freezing at -34 C (as opposed to -126 C) minimises weight losses, did not materially affect colour, improved overall appearance and did not affect off-odour incidence or tenderness. MV
- 1957 SMITH (GC), SAVELL (JW), STIFFLER (DM), JOHNSON (DD) and VANDERLIANT (C). Weight loss and quality characteristics of frozen versus chilled beef livers and hearts. *J. Food Sci.* 48(6); 1983; 1728-30, 1734
Vacuum packaging immediately after removal from animals gave the best acceptable appearance during 15-16 day transportation-distribution-storage period. Freezing at 0 hour postmortem was slightly more effective than vacuum packaging or PVC film wrapping of livers in protection of quality parameters like weight loss, off-odour incidence and excessive microbial growth. MVG
- 1958 MAWSON (RF) and SCHMIDT (GR). Binding capacity of beef and turkey muscle tissues in processed meats. *J. Food Sci.* 48(6); 1983; 1705-8, 1714
- 1959 GOSSETT (GW), SAVELL (JW), SMITH (GG) and CARPENTER (ZL). Assessing palatability characteristics of beef destined for retail distribution. *J. Food Sci.* 48(6); 1983; 1719-22
- 1960 GRAU (FH). Growth of *Escherichia coli* and *Salmonella typhimurium* on beef tissue at 25 C. *J. Food Sci.* 48(6); 1983; 1700-704
Growth of both organisms at 25 C was influenced by type of tissue, pH, gaseous atmosphere and physiological state of the cells used for inoculation. There was only a short lag period both aerobically and anaerobically on fatty tissue at high pH (≥ 6). With low pH (≤ 5.7), lag period was

extended aerobically. At low pH, lean tissue stored anaerobically at 25 C for 24 hours; aerobically grown cultures of the organisms did not grow; whereas cells from anaerobically grown cultures grew after an extended lag period. The overall results suggest that the above organisms grow more likely on fatty tissue or muscle or high pH than on low pH lean tissue during cooling of hot-boned meat. MVG

- 1961 CRAVEN (SE) and BLANKENSHIP (LC). Increased heat resistant of salmonellae in beef with added soy proteins. *J. Food Prot.* 46(5); 1983; 380-84
- 1962 COON (FP), CALKINS (CR) and MANDIGO (RW). Pre- and post-rigor sectioned and formed beef steakes manufactured with different salt levels, mixing times and tempering times. *J. Food Sci.* 48(6); 1983; 1731-4
- 1963 WILLIAMS (JC), FIELD (RA), MILLER (GJ) and WELKE (RA). Evaluation of TBA-methods for determination of lipid oxidation in red meat from four species. *J. Food Sci.* 48(6); 1983; 1776-8, 1782

LAMB

- 1964 HENRY (KG), SAVELL (JW), SMITH (GC), EHLERS (JG) and VANDERZANT (C). Physiological, sensory and microbiological characteristics of lamb retail cuts vacuum packaged in high oxygen-barrier film. *J. Food Sci.* 48(6); 1983; 1735-40, 1749
- Previous vacuum packaging (PVP) in PVC or high oxygen barrier films had no effect on appearance of rib or loin chops during subsequent retail display but high barrier vacuum packaged leg steaks from PVP cuts had lower overall appearance than fresh cuts. Flavour and odour was negatively affected by PVP storage at the conclusion of retail display. *Pseudomonas* species were dominant in PVC wrapped chops, while *L. cellubiosus* was dominant in high oxygen barrier film wrapped chops. MVG
- 1965 PETRO (KA), MILLER (GJ), WILLIAMS (JC), FIELD (RA), CROSS (HR) and SECRIST (JL). Storage and lipid quality of chunked, formed roasts containing mechanically separated lamb. *J. Food Sci.* 48(6); 1983; 1881-2
- 1966 WINGER (RJ) and LOWRY (PD). Sensory evaluation of lamb after growth of yeasts at -5 C. *J. Food Sci.* 48(6); 1983; 1883, 1885
- Cryptococcus laurentii* var. *laurentii* was inoculated at various densities onto lamb loins, which were then frozen and stored at -5 C for 10 weeks during storage; yeast numbers increased by two log cycles. Loin samples that included yeast-bearing surfaces were prepared for evaluation by a trained taste panel. No foreign flavours associated with high yeast numbers could be discriminated by the panel. AA

PORK

- 1967 ZIMMERMANN (WJ). An approach to safe microwave cooking of pork roasts containing *Trichinella spiralis*. *J. Food Sci.* 48(6); 1983; 1715-8, 1722
- Pork roasts, obtained from pigs experimentally infected with *Trichinella spiralis*, were cooked at 50% power in four microwave ovens. The attainment of consistently well done roasts is the primary requisite for develop-

ment of safe cooking methods. Recommendations for cooking of trichinous pork roasts, with adequate margins of safety, are made for each oven. AA

- 1968 MOSS (M), HOLDEN (JM), ONO (K), CROSS (R), SLOVER (H), BERRY (B), LANZA (E), THOMPSON (R), WOLF (W), VANDERSLICE (J), JOHNSON (H) and STEWART (K). Nutrient composition of fresh retail pork. *J. Food Sci.* 48(6); 1983; 1767-71
 Samples from 71 carcasses were studied. The data indicated that variation in nutrient composition is more dependent on the retail cut within the carcass than either grade or the region of production of the carcass. Method of cooking had significant effect on retention of most nutrients. MVG
- 1969 KEMP (JD), LANGLOIS (BE) and FOX (JD). Effect of potassium sorbate and vacuum packaging on the quality and microflora of dry-cured intact and boneless hams. *J. Food Sci.* 48(6); 1983; 1709-14
- 1970 ABU-BAKAR (A), REAGAN (JO), WYNNE (RL), DAVIS (CE), TOWNSEND (WE), CARPENTER (JA) and CAMPION (DR). Chemical, physical and sensory attributes of pre- and post-chill processed hams and bellies. *J. Food Sci.* 48(6); 1983; 1886-
- 1971 MILLER (AJ) and BUCHANAN (RL). Reduction of mutagen formation in cooked nitrite-free bacon by selected cooking treatments. *J. Food Sci.* 48(6); 1983; 1772-5
- 1972 SILVERMAN (GJ), MUNSEY (DT), LEE (C) and EBERT (EL). Interrelationship between water activity, temperature and 5.5 percent oxygen on growth and enterotoxin A secretion by *Staphylococcus aureus* in precooked bacon. *J. Food Sci.* 48(6); 1983; 1783-6, 1795
- 1973 PENSABENE (JW) and FIDDLER (W). N-nitrosothiazolidine in cured meat products. *J. Food Sci.* 48(6); 1983; 1870-71
 Since N-nitrosothiazolidine (NTHZ) formation in cure-pumped bacon has recently been linked to the heating-smoking step in bacon processing, a survey of other smoked cured meat products was conducted. Nitrosothiazolidine was detected in 23 of 70 products, other than cure-pumped bacon, in concentrations ranging from 1.7-19.0 ppb. No correlation of NTHZ values with either residual sodium nitrite or with product type was found. AA

SAUSAGES

- 1974 MIELNIK (J) and SLINDE (E). Sausage colour measured by integrating sphere reflectance spectrophotometry when whole blood or blood cured by nitrite is added to sausages. *J. Food Sci.* 48(6); 1983; 1723-5, 1754

FRANKFURTERS

- 1975 SOFOS (JN). Effects of reduced salt (NaCl) levels on the stability of frankfurters. *J. Food Sci.* 48(6); 1983; 1684-91
 A level of 2.5% salt gave stable emulsions of high yield and acceptable peeling properties and appearance. Reduction in salt level reduced emulsion stability and increased smoke house losses. With reduced salt, microbial growth was only slightly more rapid. It was concluded that a salt concentration in the range of 2.5-2% was necessary in commercial frankfurters.

Further reduction in salt level needs experimentation with good binding quality lean meat, appropriate pH values and possible use of other component like other salts, phosphates, etc. MVG

- 1976 SOFOS (JN). Effects of reduced salt (NaCl) levels on sensory and instrumental evaluation of frankfurters. *J. Food Sci.* 48(6); 1983; 1692-5, 1699

Colour was least affected by salt reduction. Excessive reduction of salt (by 60%) and low initial pH (5.5) resulted in increased emulsion losses which gave the product a darker appearance. With reduced salt (below 2%), texture was softer and less acceptable. A reduction of 40-60% or with initial low pH (5.5) salt reduced flavour and overall acceptability. MVG

POULTRY

- 1977 PADDA (GS). Mechanical deboning - a way to full utilization of poultry meat *Poult. Guide* 20(7); 1983; 92-4

Mechanical deboned poultry meat (MDPM) has a higher fat content (12-27%) and lower protein content (9-15%) than deboned poultry meat. The amino acid composition of MDPM, however, is comparable to that of hard deboned meat. MDPM when chopped, has good emulsion stability at 7-13 C, but it has a poor protein matrix. Centrifugation or texturisation improves its emulsion characteristics. The product can be used in red meat frankfurters, Bologna sausages, and salami, as well as in dry soup mixes, casserole mixes, and as diced chicken or turkey. MDPM has 3 times the same content of hard boned meat and is a good source of Fe. It is also likely to suffer from rancidity and lipid oxidation. It also has a higher Ca and Fl content. Microbiological hazards can be eliminated by good sanitation and temperature control. KMD

- 1978 SHARMA (KK) and THANAWALA (AJ). Chemical residues in poultry meat and eggs. *Poult. Guide.* 20(12); 1983; 45-8

The chemical residues that may occur in poultry meat and eggs have been classified into four groups: antibiotics and coccidiostats, hormones, pesticides and insecticides, and heavy metals. The presence of such residues in meat and eggs can be avoided if treatments with these substances is stopped sufficiently early before consumption. KMD

CHICKEN

- 1979 PARK (CE), STANKIEWICZ (ZK), LOVETT (J), HUNT (J) and FRANCIS (DW). Effect of temperature, duration of incubation, and pH of enrichment culture on the recovery of *Campylobacter jejuni* from eviscerated market chickens. *Can. J. Microbiol.* 29(7); 1983; 803-6

To establish an enrichment system of high efficiency for recovery of *Campylobacter jejuni* from market chickens, the effects of the temperature, duration of incubation, and pH of the enrichment culture on the isolation of the bacterium were evaluated. Whole chickens or chicken parts in plastic bags were individually rinsed, and the washings filtered through cheese-cloth. The cells were separated from the washings by centrifugation, and

the pellet was inoculated into 100 mL of enrichment broth. Isolation of *C. jejuni* from poultry samples was significantly increased by incubating these samples in an enrichment medium at 42 C as opposed to 35 C; for 48 hour as opposed to 24 hours or 72 hours; and at pH 7.0 as opposed to pH 6.0, 6.5, 7.5, or 8.0. AA

- 1980 PROCTOR (VA) and CUNNINGHAM (FE). Composition of broiler meat as influenced by cooking methods and coating. *J. Food Sci.* 48(6); 1983; 1696-9

Five different cooking methods were tried. The content of cooking losses by these methods was: baked < broiled < microwave < panfried < pressurized deep fat fried. Moisture loss could be significantly reduced by a coating. Microwave heated, deep-fat and pan fried meats had higher protein and so was in coated meats. In deep fat fried uncoated thigh meat, crude fat was higher. Differences between cooking methods, however, in respect of crude fat, were not significant. Microwave heated and uncoated meat had better mineral retention. The minerals affected by cooking methods were Fe, Mg, Na and Zn, and those not affected were Ca, P, K, S, Cu and Mn. MVG

EGG

- 1981 BAIS (RKS). Problem of egg breakages in poultry production. *Poult. Guide.* 20(7); 1983; 69-74

The author has outlined how cracks occur in egg shells and the 14 factors (strain, age, floor, nest, temperature, diseases, feeding, collection, handling, cleaning, grading, storage, packaging and transportation) that lead to crack formation have been described. KMD

- 1982 ITOH (T), ABE (Y), and ADACHI (S). Comparative studies on the α and β -phosvitin from hen's egg yolk. *J. Food Sci.* 48(6); 1983; 1755-7

Physico-chemical properties of α and β -phosvitin were compared. Considerable difference was observed in amino acid composition. Higher concentrations of carbohydrates were found in the β -component than in α . The α -phosvitin was more precipitable with 10-15 mM Ca ion than β . Phosvitin was so heat resistant that no change was observed on electropherogram by heating below 100 C for 10 minutes, and no coagulation occurred up to 140 C. About 12% of the phosphorus was liberated from whole phosvitin by heating at 140 C for 10 minutes. All preparations of phosvitin isolated from six individual eggs and mixed yolk of 57 eggs contained the two components. AA

- 1983 PANDA (PC). Egg in the diet of pregnant ladies. *Poult. Guide* 20(12); 1983; 19-21

The author supports the USDA recommendation of 1 egg/day for pregnant women. The nutritive value of eggs cooked in several ways is about the same as that of a fresh, or uncooked, egg. The amino acid composition of an egg has been compared with that of 100 g of bread or rice. A table lists the ingredients that would make up a satisfactory diet for pregnant women, at a low cost. KMD

SEAFOODS

- 1984 SERRA (TM) and SERRANO (JFV). Influence of phosphorus and calcium on flame atomic absorption spectrophotometric determination of lead in canned fish products. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 186-7

Lead was determined in the presence of whole multiples of the P/Ca ratio found in Portuguese canned fish by flame atomic absorption spectrophotometry with and without using an ashing aid. Under our experiment conditions, use of the ashing aid eliminates P and Ca interference. Results with real samples, spiked with 1,2,3, and 4 ppm lead, are presented and statistically treated. AA

- 1985 LANIER (TC) and HAMANN (DD). Evaluation of volume and pressure changes during heating as indices of protein gelation in fish pastes. *J. Food Sci.* 48(6); 1983; 1678-9

A water jacketed piston device was used to monitor pressure and volume changes during heating of lean fish batters. Contrary to published results of a similar study with pork sausage batters, no correlation could be established between thermal gelation phenomena and pressure changes at constant volume. Pressure change at constant volume was nearly linear with respect to temperature change and therefore attributed solely to thermal expansion of the material. AA

MACKEREL

- 1986 GALLARDO (JM), MONTEMAYOR (MI) and PEREZ-MARTIN (R). Formation of histamine in mackerel (*Scomber scombrus*) and skipjack (*Katsuwonus pelamis*), species with large amounts of free histidine. *Rev. Agroquim. Tecnol. Aliment.* 23(2); 1983; 269-75 (Spanish)

The effect of storage temperature on the production of histamine in mackerel (*Scomber scombrus*) and skipjack (*Katsuwonus pelamis*), was studied. The mean histamine level for mackerel muscle after 9 days storage at 3 C was 2 mg/100 g and 16 mg/100 g after 13 days. These histamine levels occurred when the fish is spoiled. Histamine was not detected in skipjack after 14 days storage at 3 C. It shows that histamine build-up depends on the histidine decarboxylase activity of the contaminant microorganisms and the results of this study support the conclusion that the microflora developing on the skipjack does not decarboxylate free histidine. AA

SWORDFISH

- 1987 OBERLENDER (V), HANNA (MO), MIGET (R), VENDERZANT (C) and FINNE (C). Storage characteristics of fresh swordfish steaks stored in carbon dioxide enriched controlled (flow-through) atmospheres. *J. Food Prot.* 46(5); 1983; 434-40

JELLYFISH

- 1988 KIMURA (S), MIURA (S) and PARK (Y-H). Collagen as the major edible component of jellyfish (*Stomolophus nomural*). *J. Food Sci.* 48(6); 1983; 1758-60

The edible portion of jelly fish mainly composed of connective tissue of protein i.e. collagen. Salted jellyfish, therefore, must be shrunk and partially gelatinised by cooking as this may have a significant effect on the unique texture of cooked jellyfish. MVG

SHELLFISH

- 1989 COOK (DW) and PABST (GS) Jr. Recommended modification of dilution procedure used for bacteriological examination of shellfish. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 197-8

PRAWN

- 1990 EYLES (MJ). Assessment of cooked prawns as a vehicle for transmission of viral disease. *J. Food Prot.* 46(5); 1983; 426-8

The method for recovery of viruses from cooked peeled prawns involves elution of viruses from surface of prawns using a suitable buffer, clarification of the extract by centrifugation and concentration by ultracentrifugation. The method enabled recovery of 70% of added polyvirus from the prawns. in the laboratory. 22-75% of added polyvirus remained ineffective for the periods normally required for transport, storage and distribution, when stored at 4-6 C and -20 C for upto 15 days and upto 300 days respectively. Examination of thirty samples of cooked prawns did not show presence of any viruses infective to man. BSN

OYSTER

- 1991 LOPEZ (A), WARD (DR) and WILLIAMS (HL). Essential elements in oysters (*Crassostrea virginica*) as affected by processing method. *J. Food Sci.* 48(6); 1983; 1680-83, 1691

The purpose of this work was to evaluate the effect of three processing methods currently used in the commercial processing of oysters in the concentration of 15 essential elements in oysters. The processing methods evaluated were: traditional hand shucking, steam tunnel, and retorting. Significant differences were observed in the retention of some of the essential elements as the result of processing. AA

PROTEIN FOODS

- 1992 MORCOS (SR), SAID (AK), GABRIAL (GN) and HADY (NAE). Supplementary and weaning foods for the Egyptian child. *Nahrung.* 27(4); 1983; 295-304

Five protein-rich mixtures, suitable for use as supplementary and weaning foods, have been prepared from vegetable and animal raw materials, in such a way that they are easy to use. Potatoes, carrots, and peas were the basal ingredients of each mixture. Their protein content falls in the range 16-20%, and their chemical score is $\geq 50\%$. The amino acid compositions of these mixtures revealed only a slight deficiency in methionine and cystine (compared to the FAO reference protein). The nutritive value of each mixture was found to be high (slope ratio method) and superior to that of casein. KMD

- 1993 McKINNEY (JD), MOORE (L), PROKOPETZ (A) and WALTERS (DB). Validated extraction and cleanup procedures for polychlorinated biphenyls and DDE in human body fluids and infant formula. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 122-9

As part of an epidemiology study, extraction methods and extract clean-up procedures were developed and validated for polychlorinated biphenyls (PCBs) and DDE, an ubiquitous metabolite of DDT, in human milk, blood serum, and infant formula. Studies included quantitative and reproducible recovery of total lipids, and reproducible and reasonably high recoveries of these chlorinated compounds from the human body fluids and infant formula, including levels of environmental health interest. An extensive quality control and assurance program was designed for use with these methods. Some validation work on serum was done using radiolabeled ^{14}C -Aroclor 1254. Dilution assays were developed to permit use of a constant procedure, which should minimize variability in results. Methods are based on selected organic solvent extraction and column chromatographic cleanup techniques and quantitation by electron capture gas chromatography (EC/GC). Using these extensively researched extraction and cleanup methods, the limits of detection for GC measurements were 10.0 and 2.00 ppb for PCBs and DDE, respectively, in milk and 4.00 and 0.80 ppb in serum. AA

- 1994 JOHNSON (RD), MANSKE (DD), NEW (DH) and PODREBARAC (DS). Pesticide, heavy metal, and other chemical residues in infant and toddler total diet samples. III. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 145-54
Monitoring data is presented in 4 papers. JVS

FRUIT JUICES AND BEVERAGES

ORANGE JUICE

- 1995 NAVARRO (JL), DIAZ (LS) and GASQUE (F). Determination of limonin in orange juice by high performance liquid chromatography (HPLC). *Rev. Agroquim. Tecnol. Aliment.* 23(2); 1983; 276-80 (Spanish)

Limonin, the compound responsible for delayed bitterness of orange juice, has a very low organoleptic threshold (6-7 ppm) and therefore its determination requires a sensitive method. In the present work, a precise and fast method for limonin determination in orange juice based on HPLC is described. The chromatographic conditions are: CN column (particle size 13 μm); mobile phase hexane/isopropilic alcohol (65/35, v/v) and $\lambda = 215 \text{ nm}$. By using these conditions, the time required for conducting the analysis is shorter than 10 minutes. Nevertheless, when in the presence of others, limonoids is suspected, the proportion of hexane in the mobile phase should be increased up to 85% in order to obtain a good separation of limonin from the other limonoids. AA

MANDARIN JUICE

- 1996 KANEKO (K), ISHIMA (T), KATAYAMA (O), MONMA (M), TOYOSHIMA (H) and ARAKI (C). Studies on volatiles from Satsuma Mandarin juice. Part 4. Statistical analysis of the juice headspace volatile peaks in gas chromatogram by Tenax GC trapping technique. *Rep. Nat. Food Res. Inst.* 58(2); 1982; 59-68 (Japanese)

d-limonene was detected on the main volatile component and it was higher in late-ripening types than in early ripening types. KAR

PEAR JUICE

- 1997 KIRK (DE), MONTGOMERY (MW) and KORTEKAAS (MG). Clarification of pear juice by hollow fiber ultrafiltration. *J. Food Sci.* 48(6); 1983; 1663-6
- A clear, amber coloured pear juice could be obtained by the hollow fiber ultrafiltration, the process parameters for which were optimised. Three membrane cartridges (50,000, 30,000 and 10,000 dalton molecular weight cut off) were tried and found similar in respect of process parameters. The permeate flux increased with increased transmembrane pressure and then declined. Higher temperatures (within temperature limitation of the membrane) gave higher flux which decreased linearly with the 10 g of the concentration. MVG

BLACKCURRANT SYRUP

- 1998 SKREDE (G), NAES (T) and MARTENS (M). Visual colour deterioration in black-current syrup predicted by different instrumental variables. *J. Food Sci.* 48(6); 1983; 1745-9

MAPLE SYRUP

- 1999 MORSELLI (MF) and BAGGETT (KL). Mass spectrometric determination of cane sugar and corn syrup in maple syrup by use of $^{13}\text{C}/^{12}\text{C}$ ratio: collaborative study. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 22-4

SOFT DRINKS

- 2000 Van RILLAER (WG) and BEERNAERT (H). Determination of residual isopropanol and propylene glycol in soft drinks by glass capillary gas chromatography. *Z. Lebensmittel-Unters. Forsch.* 177(3); 1983; 196-9

TEA

- 2001 NEUMANN (K) and MONTAG (A). Contribution to the knowledge on some nitrogenous substances in tea (*Camellia sinensis*). *Dtsch. Lebensmittel-Rundschau.* 79(5); 1983; 160-64 (German)
- Theanine (glutamic acid ethyl amide) is the amino acid present in greatest amounts in tea, but it is not a component of tea protein. Both theanine and glutamic acid methyl amide, were found only as free amino acids. The distribution of free amino acids was tested for any possible correlation with the origin, mode of cultivation, and mode of preparation of tea. It was found that the content of 4-aminobutyric acid did not necessarily indicate a tea of poor quality. The Kjeldahl factor for teas protein was found to be 5.52. Other constituents present in tea extracts were: ethyl, methyl, and propyl amines; putrescine, cadaverine, spermidine, and spermine; and also histamine in traces. KMD

- 2002 ROBERTSON (A). Effects of catechin concentration on the formation of black tea polyphenols during *in vitro* oxidation. *Phytochemistry*. 22(4); 1983; 897-903

An *in vitro* model fermentation system, containing purified catechins and partially purified polyphenol oxidase (EC 1.14.81.1) from green tea shoots, has been used to determine the effect of catechin mixtures of different concentration and proportions on the formation of theaflavin and thearubigin. Increases in total catechin concentration, 25% above that typical in green tea shoots of Malawi-grown bushes, inhibited polyphenol oxidase activity, and, consequently, depressed theaflavin levels. Individual or combined concentrations of epicatechin gallate and epigallocatechin gallate in excess of 110 mM were shown to be responsible for enzyme inhibition, whereas epicatechin and epigallocatechin had no effect. Fermentation of a catechin mixture, containing the four major catechins, epicatechin, epigallocatechin, epigallocatechin gallate and epicatechin gallate, at equal individual concentrations (55 mM), produced, after 30 minutes, total theaflavin levels 68% higher and thearubigin levels only 25% higher than those from a standard catechin mixture fermented under similar conditions. Continued fermentation of this mixture produced no further theaflavin, but the thearubigin fraction increased significantly, due to subsequent oxidation of the excess of simple catechins. A new catechin mixture was, therefore, calculated to give a similar level of theaflavin to that of the previous mixture without leaving an excess of unoxidized simple catechins. The catechin proportions and concentrations of the latter mixture agree well with those of the green shoots of quality Kenyan teas or similar quality Malawi teas grown during the dry cold season. The results indicate that a high ratio of simple to gallocatechins will facilitate a high theaflavin thearubigin ratio in black tea. AA

WINE

- 2003 ZEE (JA), SZOGHY (IM), SIMARD (RE) and TREMBLAY (J). Elemental analysis of Canadian, European and American wines by photon induced X-ray fluorescence. *Am. J. Enol. Vitic.* 34(3); 1983; 152-6

Photon induced X-ray fluorescence analysis of 231 Canadian, American and European wines, revealed that red wines contained more P, S and K and less Ca than white wines. P content was lowest in Portuguese red wines, while most of Cl and K was found in Canadian and French red wines. White wines of USA showed the highest amount of Ca and relatively high amounts of P, S, Cl and K. Spanish wines contained lowest P and K contents, whereas French wines showed the lowest S and Cl contents. Lowest Ca amounts were, however, present in Portuguese wines. BSN

- 2004 MASON (M). Ethanol determination in wine with an immobilized enzyme electrode. *Am. J. Enol. Vitic.* 34(3); 1983; 173-5

The purpose of this work was to demonstrate the accuracy and precision of a new method for ethanol determination. This method utilizes a thin microporous membrane containing immobilized alcohol oxidase (E.C.1.1.3.13) which is mounted on an amperometric electrode. When ethanol enters the membrane it is rapidly oxidized producing hydrogen peroxide and acetaldehyde. The hydrogen peroxide is oxidized at the electrode giving rise to a signal current directly proportional to hydrogen peroxide concentration, and hence to ethanol concentration. The coefficient of variation for six analyses of eight wine samples was better than 1.0%, and agreement with A.O.A.C. specific gravity method was excellent. AA

- 2005 SCHMIDT (JO) and NOBLE (AC). Investigation of the effect of skin contact time on wine flavour. *Am. J. Enol. Vitic.* 34(3); 1983; 135-8

SHERRY

- 2006 OLANO (A). Presence of trehalose and sugar alcohols in Sherry. *Am. J. Enol. Vitic.* 34(3); 1983; 148-51
- Satisfactory recovery (98-100%) and repeatability with coefficients of variation less than 8% and 16% for inositol and trehalose respectively in wine was obtained by a simple GLC technique. Sorbitol, mannitol and inositol contents in four solera systems and sixteen samples of Spanish sherries were also determined. Concentration of these compounds during aging did not follow a regular pattern. BSN

BEER

- 2007 CUTAIA (AJ). Malt beverages and brewing materials: Gas chromatographic determination of ethanol in beer. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 192-3

The GC method has been adapted for official first action after collaborative testing by 10 laboratories. JVS

- 2008 OSTERDAHL (B-G). Volatile N-nitrosamines in beer and other alcoholic beverages. *Var Foda* 35(5); 1983; 215-30 (Swedish)

About 300 samples of beer, whisky, wine, etc. were examined in 1979-1982 for volatile N-nitrosamines. A rapid and simple column chromatography method is described for the isolation of the nitrosamines. N-Nitrosodimethylamine (NDMA) was detected in 104 of 210 beer samples analysed. The mean content was 0.34 µg/l and the highest value obtained was 6.5 µg/l. The NDMA content in beer in 1982 was conspicuously lower than in 1979-1981. Strong beer contained higher levels of NDMA than light beers. No differences in the NDMA content could be observed between regular beers and dark beers or between domestic and imported beers. On the other hand, the NDMA content varied in beer from different breweries, depending on what kind of malt they use. Trace amount of N-nitrosopiperidine were found in a few samples of beer. Eleven out of 15 samples of whisky contained NDMA at levels up to 1.2 µg/l. All 60 samples of wines were negative. The mean intake of NDMA from beer was estimated to be 0.03 µg per person per day, which corresponds to 3 to 30 per cent of the calculated total dietary intake of volatile nitrosamines in Sweden. AA

MALT

- 2009 HAVERY (DC), PERFETTI (GA) and FAZIO (T). Rapid column method for determination of N-nitrosodimethylamine in malt. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 20-21

The average recovery of NDMA added to malt at the 10 ppb level was 87%. When a single malt sample was analyzed 10 times, the NDMA found averaged 8.1 ppb with a coefficient of variation of 3.93%. In a study of 15 malt samples, data obtained by the column elution method were in good agreement with those from a vacuum distillation method. AA

OILS AND FATS

- 2010 Symposium on "Vegetable Oils as Diesel Fuels" 2-6 May 1983, Toronto. *J. Am. Oil Chem. Soc.* 60(8); 1983; 1557-1601

The following ten papers appear in this issue: PRYDE (EH) - Vegetable oils as diesel fuels. Overview; 1557; BACKER (LF), JACOBSEN (L) and OLSON (JC) - Farm-scale recovery and characteristics of sunflower oil for use in diesel engines, 1558; HELGESON (DL) and SCHAFFNER (LW) - Economics of on-farm processing of sunflower oil, 1561; ZIEJEWSKI (M) and KAUFMAN (KR) - Laboratory endurance test of a sunflower oil blend in a diesel engine, 1567; ADAMS (C), PETERS (JF), RAND (MC), SCHROER (BJ) and ZIEMKE (MC) - Investigation of soyabean oil as a diesel fuel extender: Endurance tests, 1574; PETERSON (CL), AULD (DL) and KORUS (RA) - Winter rape oil fuel for diesel engines: Recovery and utilization, 1578; STRAYER (RC), BLAKE (JA) and CRAIG (WK) - Canola and high erucic rapeseed oil as substitutes for diesel fuel: Preliminary tests, 1587; ENGLER (CR), JOHNSON (LA), LEPORI (WA) and YARBROUGH (CM) - Effects of processing and chemical characteristics of plant oils on performance of an indirect-injection diesel engine, 1592; KLOPFENSTEIN (WE) and WALKER (HS) - Efficiencies of various esters of fatty acids as diesel fuels, 1596, NYE (MJ), WILLIAMSON (TW), DESHPANDE (S), SCHRADER (JH), SNIVELY (WH), YORKEWICH (TP) and FRENCH (CL) - Conversion of used frying oil to diesel fuel by transesterification: Preliminary tests, 1598. KMD

- 2011 MOHARIR (AS), BHATIA (S) and SARAF (DN). Optimization of industrial vegetable oil hydrogenators. *J. Am. Oil Chem. Soc.* 60(8); 1983; 1543-7

A method to optimize the operation of industrial vegetable oil hydrogenators is proposed. The hydrogenation data from an operating plant are used to fit a simple mathematical model which is then used to select values for temperature and hydrogen pressure such that a desired product is obtained in minimum hydrogenation time, Methodology is suggested whereby any nonoptimal operation can be changed to optimal operation in a few trials. AA

- 2012 WILLIAMS (MG) and MACGEE (J). Rapid determination of free fatty acids in vegetable oils by gas liquid chromatography. *J. Am. Oil Chem. Soc.* 60(8); 1983; 1507-9

- 2013 YOUNG (S), CLOWER (M) Jr. and ROACH (JAG). Method for determination of organohalogen pesticide residues in vegetable oil refinery by-products. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 95-106

The method has used gel permeation and florisil column chromatographic clean-up for the determination of non-polar organohalogen residues and pesticide alteration products in vegetable oils and their refinery products. Recoveries level 102 to 116% for 4 pesticides added to peanut oil deodoriser distillate. JVS

- 2014 FRANZKE (Cl) and KROLL (J). Identification of fatty acid anilides in salad oil. *Nahrung.* 27(4); 1983; K19-K20 (German)

During 1981, there occurred in Spain some mysterious cases of serious food poisoning, after consumption of salad oil. It was found that oil to which aniline (1-50 mg/kg) and acetanilide (1500-2000 mg/kg) had been added and which was meant only for industrial uses had been sold as edible oil. Among the fatty acid anilides, oleic acid anilide is known to be particularly

toxic. The authors have described a simple and practical method for the detection of anilides in edible oils, based on a mild hydrolysis, which does not affect the anilides, and consequently allows them to accumulate in the non-saponifiable fraction where they can be detected by TLC. KMD

- 2015 RAIE (MY), MANZOOR (A), KHAN (SA) and CHAUDHRY (AH). Chromatographic fixed oils analysis of *Sisymbrium irio* and *Camelina sativa* of cruciferae family. *Fette Seifen Anstrichm.* 85(6); 1983; 238-9

The fatty acid percentage-wise composition of *Sisymbrium irio* and *Camelina sativa* as determined by GLC, containing 22.0% and 23.0% oil respectively, is C_{14:0} (0.7, 0.5), C_{16:0} (15.8, 9.0), C_{18:0} (3.5, 2.8), C_{18:1} (17.2, 20.7), C_{18:2} (15.6, 22.9), C_{18:3} (37.1, 34.3), C_{20:0} (0.0, 2.0), C_{20:1} (0.0, 7.8) and C_{22:1} (10.1, 0.0). AA

CALODENDRUM CAPENSE OIL

- 2016 MUNAVU (RM). Fatty acid composition of seed kernel oil of *Calodendrum capense* (Lf.) Thunb. *J. Am. Oil Chem. Soc.* 60(9); 1983; 1953

CANOLA OIL

- 2017 DIOSADY (LL), RUBIN (LJ), TING (N) and TRASS (O). Rapid extraction of Canola oil. *J. Am. Oil Chem. Soc.* 60(9); 1983; 1658-61

The Szego mill-developed by O.Trass - is a unique orbital mill that combines, simultaneously, size reduction and solvent extraction. When Canola seeds (a variety of rapeseed) were subjected to "solvent grinding" in this mill, over 95% of the oil could be removed in a single contact stage. Contact times as short as 30 secs gave significant extraction, while the system approached the equilibrium state after 1 minute. Thus, the Szego mill appears to be suitable for the rapid extraction of edible oilseeds such as rapeseed. KMD

CENTRATHERUM ANTHELMINTICUM OIL

- 2018 BATRA (A), MEHTA (BK) and BOKADIA (MM). *Centrathium anthelminticum* - Identification of the fatty acid composition and antimicrobial activity of the oil. *Fette Seifen Anstrichm.* 85(6); 1983; 230-32

The physico-chemical characteristics and the fatty acid composition of the seed oil of *Centrathium anthelminticum* were examined. The oil is rich in palmitic acid (30.4%), stearic acid (11.9%), oleic acid (23.7%), and linoleic acid (19.9%). Furthermore the antimicrobial characteristics of the oil were estimated. AA

OLIVE OIL

- 2019 BOSKOU (D) and KARAPOSTOLAKIS (A). Fatty acid composition on *trans* isomer content of hardened olive oil. *J. Am. Oil Chem. Soc.* 60(8); 1983; 1517-9

PALM OIL

- 2020 AUGUSTIN (MA) and BERRY (SK). Efficacy of the antioxidants BHA and BHT in palm olein during heating and frying. *J. Am. Oil Chem. Soc.* 60(8); 1983; 1520-23

The effectiveness of butylated hydroxyanisole (BHA) and butylated hydroxytoluene (BHT) in retarding the deterioration of RBD palm olein during static heating (180 C) and frying operations was assessed by determining the peroxide, anisidine, acid and iodine values; absorbances at 232 and 268 nm; and the fatty acid composition of the oil. During static heating of the oil, BHA was found to be a more effective antioxidant than BHT whereas, during intermittent frying of potato chips, both the antioxidants were relatively ineffective in retarding the deterioration of the oil. The loss of BHT from the oil during static heating exceeded that of BHA. On the other hand, when potato chips were fried in the oil periodically, a higher loss of BHA was observed. AA

FATS

- 2021 van DORP (DA). My years in lipid research. *J. Am. Oil Chem. Soc.* 60(9); 1983; 1645-8

The author has reviewed his own work in the field of vitamin A research during the period 1941-1961 (approx.) and in the field of arachidonic acid and prostaglandins thereafter. KMD

- 2022 SLOVER (HT), THOMPSON (RH) Jr. and MEROLA (GV). Determination of tocopherols and sterols by capillary gas chromatography. *J. Am. Oil Chem. Soc.* 60(8); 1983; 1524-8

- 2023 PENNINGER (J), BIERMANN (M) and KRAUSE (H-J). New 1-triacontanol syntheses on fat chemical basis. *Fette Seifen Anstrichm.* 85(6); 1983; 239-41

1-Triacontanol is a plant growth promoting agent. Three syntheses for formation of C₃₀ chains from suitable fat derivatives have been developed. The C-C linkage took place either by co-metathesis, by mixed estercondensation or by Wittig reaction. AA

- 2024 CARAGAY (AB). Pacing technologies in the fats and oils industry. *J. Am. Oil Chem. Soc.* 60(9); 1983; 1641-4

The pacing technologies in the fats and oils industry are considered to be: 1) automation and process control; (2) physical refining - impact on traditional caustic refining of soyabean oil; (3) critical fluids - alternative to hexane extraction; deodourization and fractionation; (4) enzyme-assisted oil extraction; (5) fluid-bed technology; (6) enzymes for selective interesterification. KMD

- 2025 HASAN (SQ), AHMAD (I), AHMAD (F) and OSMAN (SM). Studies on nitrosochlorination of olefinic fatty acids. 1. *J. Am. Oil Chem. Soc.* 60(8); 1983; 1534-7

- 2026 HASHMI (M), KHAN (M), AHMAD (MS) Jr., AHMAD (F) and OSMAN (SM). oxidative cyclization of unsaturated fatty acids with lead tetraacetate. *J. Am. Oil Chem. Soc.* 60(8); 1983; 1538-43

SALFAT

- 2027 CHAUDHURI (PG), CHAKRABARTY (MM) and BHATTACHARYYA (DK). Modification of some tree borne seed fats for the preparation of high priced confectionery fats. *Fette Seifen Anstrichm.* 85(6); 1983; 224-7
- Sal (*Shorea robusta*), mango kernel (*Mangifera indica*) and mowrah (*Madhuca latifolia*) are three major tree borne seed fats and regarded as potential cocoabutter substitute when suitably modified. Modification of these fats by fractionation from solvent and blending of the fractions among themselves and with other suitable fatty material yielded a series of high priced confectionery fats. AA

VANASPATI

- 2028 KRISHNAMURTHY (MN), SUDERSHAN RAO (V), MALLIKA SHARMA AND KAPUR (OP). Detection of animal fat (beef tallow) in vanaspati - a note. *Indian Food Pack-er.* 37(6); 1983; 108-111
- Microscopic examination for presence of beef, lard and hydrogenated fat was found to be a preliminary and rough screening test for detection of animal fat in vanaspati. However, in case, there is even the slightest possibility of the presence of a very small amount of animal fat in vanaspati, the reverse phase TLC on Kieselghur-G- or GLC of fatty methyl esters have been recommended on the basis of studies carried out in the laboratory. BSN

SPICES AND CONDIMENTS

OREGANO

- 2029 GECAN (JS), BANDLER (R), GLAZE (LE) and ATKINSON (JC). Microanalytical quality of ground and unground oregano, ground cinnamon and ground nutmeg. *J. Food Prot.* 46(5); 1983; 387-90
- The AOAC method intended for counting light filth was employed for determination of sanitary quality of unground and ground oregano, ground nutmeg and ground cinnamon market samples collected over a 3-year period. The mean counts ranged from 27.9-265.7. The data reported are as follows: Insect fragments, 92-97.5% in ground and unground oregano samples; rodent hair fragments, 0-703; feather barbules, 0-99; mites, 0-52; thrins 0-95; and aphids, 0-20. BSN

CHILLI

- 2030 BATA (A), LASZTITY (R), SARUDI (I) and CSERHALMI (ZO). Screening program concerning eventual occurrence of zearalenone in Hungarian red pepper. *Z. Lebensmittel-Unters. Forsch.* 177(3); 1983; 203-4
- The method used consists of the extraction of the sample, then a chemical purification is followed by a capillary gas-chromatographic analysis, after recovery and determination of the scatter of results. To start with, the zearalenone contents were also determined in samples having higher than average mould counts. No zearalenone was found in the samples examined in 1980/81. AA

SENSORY EVALUATION

- 2031 FISZMAN (SM), COSTELL (E) and DURAN (L). Measurement of the rheological behaviour of solid foods. I. Theoretical basis. *Rev. Agroquim. Tecnol. Aliment.* 23(2); 1983; 164-72 (Spanish)

FOOD STORAGE

- 2032 ANON. Silos. *Milling Feed Fert.* 166(1); 1983; 27-9

INFESTATION CONTROL AND PESTICIDES

- 2033 FEHRINGER (NV) and WALTERS (SM). Evaluation of capillary gas chromatography for pesticide and industrial chemical residue analysis. I. Comparison of retention ratios obtained on methyl silicone - coated capillary columns with published values for packed columns. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 91-5

- 2034 GRETCH (FM) and ROSEN (JD). Automated sample cleanup for pesticide multi-residue determination. I. Evaluation of solvent partitioning module. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 108-11

An automated continuous flow procedure is described that improves the cost effectiveness and precision of AOAC methodology for multi-residue pesticide determinations in nonfatty foods. Individual modules capable of performing automated solvent partitioning and automated column chromatography were constructed and integrated into a continuous flow system. Data are presented comparing the recoveries and precision for the determination of 8 pesticides (aldrin, dieldrin, p,p'-DDT, ethion, heptachlor epoxide, lindane, parathion, and ronnel) partitioned from 2 food crops (spinach and tomatoes) by both the manual and automated procedures. AA

- 2035 NASH (RG). Extraction of pesticides from environmental samples by steam distillation. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 199-203

BIOCHEMISTRY AND NUTRITION

- 2036 HACKLER (LR), BODWELL (CE), HAPPICH (ML), PHILLIPS (JG), DERSE (PH), ELLIOTT (JG), HARTNAGEL (RE) Jr., HOPKINS (DT), KAPISZKA (EL), MITCHELL (GV), PARSONS (GF), PRESCHER (EE), ROBAIDEK (ES) and WOMACK (M). Protein efficiency ratio: AACC/ASTM collaborative study. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 66-77

Eight laboratories (7 of the laboratories conducted animal experiments) participated in a collaborative study to standardize some of the methodology associated with animal bioassays for determining protein efficiency ratios and to suggest improvements which would reduce the variation among laboratories. One-, 2-, 3-, and 4-week protein efficiency ratio (PER) with 0-, 2-, or 4-day adaptation periods were obtained from each laboratory, respectively, for 6 protein sources: casein, lean beef, lactalbumin, textured

vegetable protein, peanut flour, and wheat flour. Analyses were computed for PER and adjusted PER (APER). From the analysis of variance for PER and APER significant ($P < 0.05$) effects were observed due to laboratories, adaptation length, protein sources, and/or interactions among these variables. In general APER values show much less variation among laboratories than PER values. The reproducibility and repeatability variances were significantly ($P < 0.05$) greater for an assay length of 2 weeks than they were for 3- or 4-week assays. Two protein sources, casein and textured vegetable protein, were fed at both high (10%) and low (6%) levels of protein. Analysis of variance of PER values shows a significant ($P < 0.05$) laboratory by protein level by assay length interaction. AA

- 2037 SAVOIE (L) and PARENT (G). Susceptibility of protein fractions to lysino-alanine formation. *J. Food Sci.* 48(6); 1983; 1876-7
- 2038 SOLOMONS (NW) and ALLEN (LH). The functional assessment of nutritional status: Principles, practice and potential. *Nutr. Rev.* 41(2); 1983; 33-50
- 2039 SARASWATHI (G), SUNDARAVALLI (OE) and SHURPALEKAR (KS). Physiological effects of dietary fibre of some Indian foods in rats. *Qualitas plantarum.* 33(4); 1983; 243-9
Ragi starch increased faecal weight in rats with a concomitant decrease in the transmit time (TT). Decrease in TT was more effective with cotyledon than with testa of cowpea. Changes in caecal volume and content was observed with whole cowpea and brinjal. Wide variation was observed in digestibility of fibre from test food materials used. BSN
- 2040 JONXIS (JHP). Trace elements. *Voeding.* 44(8); 1983; 266-73
A brief review of the importance of trace elements in the life of animals and human beings. The elements discussed in some detail are zinc, copper, chromium, manganese, molybdenum, selenium, vanadium, silicon, tin and nickel. KMD
- 2041 BUNNIK (GSJ). Cancer: Definition of the concept. *Voeding.* 44(8); 1983; 275-77
The author has tried to outline the concept of cancer, by mentioning some of the morphological and biochemical phenomena that accompany it. He has also attempted a classification of various carcinogens, and the role of food in the production of cancer. KMD

TOXICOLOGY AND HYGIENE

- 2042 HAMMAR (J) and SLORACH (SA). Decreased risk of contamination of food with asbestos. *Var Foda.* 35(5); 1983; 204-14 (Swedish)
Asbestos - which is a fibrous form of several mineral silicates - may enter into food because of the use of asbestos-containing materials for filtering beverages, and of pizza ovens. Drinking water which has come into contact with asbestos-rich rocks may also be contaminated. Analysis of beverages and foods for asbestos fibres is difficult and expensive and hence little is known about the presence of asbestos in foods. Inhalation of asbestos causes lung cancer, but it is not known whether asbestos can cause cancer, or other diseases, in the intestinal tract. Nowadays, asbestos in beverage filters and pizza ovens is being replaced by other materials. KMD

- 2043 RATHINAVELU (A) and SHANMUGASUNDARAM (ERB). Simple colorimetric estimation of cyclopiazonic acid in contaminated food and feeds. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 38-40
- A method has been developed for quantitative determination of cyclopiazonic acid, a mycotoxin produced by a common food contaminant, *Penicillium cyclopium*. The organism was grown successively in synthetic minimal medium, rice, corn, and wheat for 15 days. The toxin was extracted with chloroform followed by separation by thin layer chromatography. A colorimetric assay procedure has been successfully developed for the analysis of cyclopiazonic acid present in infected rice, corn, and wheat. The sensitivity of the method was tested by using recovery experiments. AA
- 2044 ROWLEY (DB), FIRSTENBERG-EDEN (R) and SHATTUCK (GE). Radiation-injured *Clostridium botulinum* type E spores: Outgrowth and repair. *J. Food Sci.* 48(6); 1983; 1829-31, 1848
- C. botulinum* type E spores were injured by 0.1-0.4 Mrad to various degrees. The injured spores (by 0.3 Mrad irradiation) (either on chicken skins or exudate) were unable to produce toxin at 10 C. However, if the chicken skins were incubated at 30 C, toxin was formed due to the ability of the radiation injured spores to repair and behave as normal spores. MVG
- 2045 D'AOUST (J-Y), BECKERS (HJ), BOOTHROYD (M), MATES (A), McKEE (CR), MORAN (AB), SADO (P), SPAIN (GE), SPERBER (WH), VASSILIADIS (P), WAGNER (DE) and WIBERG (C). ICMSF methods studies. XIV. Comparative study on recovery of *Salmonella* from refrigerated preenrichment and enrichment broth cultures. *J. Food Prot.* 46(5); 1983; 391-9, 402
- 2046 NOTERMANS (S) and HEUVELMAN (CJ). Combined effect of water activity, pH and sub-optimal temperature on growth and enterotoxin production of *Staphylococcus aureus*. *J. Food Sci.* 48(6); 1983; 1832-5, 1840
- The studies were carried out in brain-heart-infusion broth with respectively NaCl and sucrose as humectants. Results showed that no growth was evident at lower a_w , pH or temperature, viz. 0.85, 4.3 or 8 C respectively. At 12 C no growth occurred at a_w 90 or a_w 93 in combination with pH 5.5. Again at a_w 96 no growth occurred at pH $\leq$ 4.9. Type A toxin was found to grow under all conditions allowing growth; growth of type B toxin, however, was determined by a_w . Type C and F toxins seemed to be affected by both by a_w and temperature. The significance of these factors in relation to food has been discussed. MVG
- 2047 NOTERMANS (S). Detection of *Staphylococcus* enterotoxins in food by means of the ELISA test. *Dtsch. Lebensmittel-Rundschau.* 79(5); 1983; 156-9 (German)
- An enzyme-linked immunosorbent assay (ELISA) for the detection of *Staphylococcus* enterotoxins (SE) in foods has been described in detail. The sensitivity of ELISA is about 100 times as high as that of the gel-diffusion technique. The rate of recovery is 2-3 times better than in the existing methods. The proteins in the food do not produce any false-positive results. In minced meat, the recovery rate was satisfactory (40-50%). But in cooked minced meat, the loss of added toxin was about 99%. This may be due to binding of the toxin to the protein, or to an immunological inactivation of the SE. Thus, ELISA measures only the biologically active SE, and hence has good prospects of use in food analysis. KMD

- 2048 BAUR (FJ) and PARKER (WA). The aflatoxin problem: Industry-FDA-USDA cooperation. *J. Assoc. Off. Anal. Chem.* 67(1); 1984; 3-7

The study of an impavelled cooperation between industry and government on a consumer problem namely aflatoxin. JVS

- 2049 FISCHBACH (H). Coping with the aflatoxin problem in the early years. *Assoc. Off. Anal. Chem.* 67(1); 1984; 1-3

History of the aflatoxin problem and chronicling of events leading to the development of procedures in 1964 for aflatoxin. JVS

- 2050 McKINNEY (JD). Analyst performance with aflatoxin methods as determined from AOCS smalley check sample program: Short-term and long-term views. *Assoc. Off. Anal. Chem.* 67(1); 1984; 25-31

The International Smalley Aflatoxin Check Sample Program of the American Oil Chemists' Society has offered check sample series for aflatoxins in peanut meal, cottonseed meal, and corn meal since 1976, and an aflatoxin M₁ in raw milk series since 1980. This paper provides the computed mean of all analysts' results and between-laboratory precision for each of the samples in each of the check sample series distributed in 1980-81 and 1981-82. In addition, a comparison is made of the relative measurement and analytical accuracy of those analysts who have participated in the peanut meal series for at least 4 years and in the cottonseed and corn meal series since their inception (6 years). AA

GENERAL

- 2051 POMMER (G). Alternative agricultural production. *Getreide Mehl Brot*. 37(7); 1983; 195-8 (German)
- 2052 SLATER (LE). Opportunities for high-technology in India's food system. *Indian Food Packer*. 37(3); 1983; 16-26
Aspects covered include food irradiation, aseptic processing, thermal pouch and age of extrusion. BSN

FOOD PROCESSING AND PACKAGING

PROCESSING

- 2053 MISHKIN (M), SAGUY (I) and KAREL (M). Minimizing ascorbic acid loss during air drying with a constraint on enzyme inactivation for a hypothetical foodstuff. *J. Food Process. Preserv.* 7(3); 1983; 193-210
- 2054 KACYN (LJ), SAGUY (I) and KAREL (M). Kinetics of oxidation of dehydrated food at low oxygen pressures. *J. Food Process. Preserv.* 7(3); 1983; 161-78
- 2055 BERRY (MR) Jr. and KOHNHORST (AL). Critical factors for thermal processing of institutional pouches. *J. Food Prot.* 46(6); 1983; 487-9
Examination of institutional sized pouches filled with whole kernel corn in brine and condensed cream of celery soup and heated in a still retort revealed that the F_0 value for the soup was reduced from 11.5 to 2.5 minutes, as the residual air in the pouch increased to 250 ml. By eliminating the circulation of heating water between pouch layers, the critical dimension for heat transfer increased, when F_0 for the soup fell to a low level of 0.6 minute, which is an unacceptable value. BSN

PACKAGING

- 2056 ROONEY (ML). Photosensitive oxygen scavenger films: An alternative to vacuum packaging. *CSIRO Food Res.* 43(1); 1983; 9-11
The new technique involves sealing a small coil of ethyl cellulose film containing a dissolved photosensitizing dye in the headspace of a transparent package. On illumination of the film excited dye, molecules excite oxygen molecules, which have diffused into the polymer, to the singlet state. There, singlet oxygen molecules, in turn diffuse to react with acceptor molecules, which are essentially immobile in the matrix, and are thereby consumed. It is concluded that the oxygen scavenging rate depends initially on the rate of diffusion of oxygen into the film. The photosensitizing dye, the acceptor or the reaction product may migrate into the food in the present system, polymers with dyes and acceptors, as part of the polymer chain or as such being evaluated. KAR

FOOD ENGINEERING AND EQUIPMENT

- 2057 SANKARANARAYANAN (PE), SUDHAKARA RAO (P) and SRIDHAR (R). Vibrotone: Electronic vacuum measuring instrument for canned food products. *Invent. Intell.* 19(1); 1984; 31-3

The design, operational features and advantages of vibrotone, an electronic instrument for determination, in a nondestructive manner, of vacuum in canned foods has been described. BSN

ENERGY IN FOOD PROCESSING

- 2058 BOSE (PR), VASHIST (VN) and GUPTA (BM). Viability of biomass as an alternative source of energy in India. *Res. Ind.* 28(3); 1983; 195-202

- 2059 RADHIKA (LG), SESHADRI (SK) and MOHANDAS (PN). Energy from agricultural wastes. *J. Sci. Ind. Res.* 43(1); 1984; 10-16

The present status of utilisation of agro-wastes for purposes of energy production, and future possibilities are reviewed. MVG

FOOD CHEMISTRY AND ANALYSIS

- 2060 NIEKAMP (A), UNKLESBAY (K), UNKLESBAY (N) and ELLERSIECK (M). Thermal properties of bentonite-water dispersions used for modelling foods. *J. Food Sci.* 49(1); 1984; 28-31

- 2061 FOX (M), LONCIN (M) and WEISS (M). Investigations into the influence of water activity, pH and heat treatment on the velocity of the Maillard reaction in foods. *J. Food Quality.* 6(2); 1983; 103-18

The influence of temperature, time of heat treatment, pH-value and water activity on the formation of brown pigments in Maillard reaction was investigated with a model product consisting of the reducing sugar, glucose and the amino acid alanine. It was observed that the lag time necessary before the reaction produced brown pigment was so long that this reaction was insignificant in a combination processing method using the parameters under investigation. KAR

- 2062 LEDL (F), KRONIG (U), SEVERIN (T) and LOTTER (H). Investigations relating to Maillard-reaction XVIII. Isolation of N-containing coloured products. *Z. Lebensmittel-Unters. Forsch.* 177(4); 1983; 267-70 (German)

- 2063 PRASAD (VS) and SUBRAMONIA IYER (K). Drinking water - quality aspects. *Sci. Rep.* 20(3); 1983; 148-50, 179

- 2064 WIERENGA (B). Model and measurement methodology for the analysis of consumer choice of food products. *J. Food Quality.* 6(2); 1983; 119-37

This paper considers the problem of a consumer purchasing a food product within a certain product class and making a choice from the different alternatives that are available. KAR

2065 AMIN (D), SULAIMAN (ST) and AL-ABACHI (Q). Titrimetric and polarographic microdetermination of nitrite by amplification reactions. *J. Indian Chem. Soc.* 60(10); 1983; 982-4

2066 De KLEIJN (JP). HPLC applied to the determination of iodide in iodised salt. *Dtsch. Lebensmittel-Rundschau.* 79(6); 1983; 184

2067 SCHWEDT (G) and WEBER (G). Separation procedures in the analysis of element-bonding modes in common and luxury foods. *Dtsch. Lebensmittel-Rundschau.* 79(7); 1983; 213-21 (German)

An analytical strategy has been worked out for the differential trace analysis of metals like Cu, Ni, Fe, Zn, and Co in plant foods (like peas and soy flour) and in luxury foods (like tea, coffee, and red wine). Emphasis is laid on different separation techniques employed before resorting to TLC or HPLC. Preliminary results have been reported. Thus, a method is now available for testing the toxicity, or bio-availability, of some trace elements. KMD

FOOD LAWS AND REGULATIONS

2068 TAYLOR (MR). Federal preemption and Food and Drug Regulation: The practical, modern meaning of an ancient doctrine. *Food Drug Cosmet. Law J.* 38(4); 1983; 306-17

2069 ANON. Japan. Food and sanitary regulations. *Profodcil Bull.* 18(1); 1983; 14-30

Various health and sanitary regulations governing the imports of agricultural and food products into Japan to ensure that consumers receive wholesome, disease-free and pest free foods, have been described. MVG

2070 BAUMGARTNER (E). The official food control service in Switzerland. *Dtsch. Lebensmittel-Rundschau.* 79(8); 1983; 251-7 (German)

FOOD MICROBIOLOGY

2071 LESLIE (JE), BARNETT (JE), BACHELOR (HK), PEELER (JT) and MESSER (JW). Reliability and analyst performance limits for the field and single strip direct microscopic somatic cell count procedure. *J. Food Prot.* 46(6); 1983; 490-92

2072 KIRSCH (AJ) and CHEN (T-S). Comparison of conjugase treatment procedures in the microbiological assay for food folacin. *J. Food Sci.* 49(1); 1984; 94-8

Variations in conjugase treatment step of the microbiological assay for food folacin were investigated. The source of the conjugase-fresh hog kidney, fresh chicken pancreas or commercial dried chicken pancreas - did not significantly affect the measurable folacin activity of spinach. However, the buffer, pH, incubation time, sequence of steps in extraction and conjugase treatment and method of sample filtration (filter paper versus centrifuge) used prior to conjugase treatment were all found to significantly affect the folacin activity of spinach. AA

FERMENTATION

- 2073 ILCZUK (Z). Attempts at improving citric fermentation on molasses solutions. *European J. Appl. Microbiol. Biotechnol.* 17(1); 1983; 69-72
- 2074 ZAIKA (LL) and KISSINGER (JC). Fermentation enhancement by spices: identification of active component. *J. Food Sci.* 49(1); 1984; 5-9
- Efforts have been made to identify and characterise the component common in all spices that stimulates lactic acid production by meat starter culture bacteria. As manganese was identified as the component, it might have a potential as a means of accelerating production of fermented meat products, particularly when stimulating spices are not used or only oleoresins or other flavourings are used. It was also found that increased acidity afforded greater protection against *Staphylococcus aureus* and other pathogenic bacteria. The study also suggests that trace metals in food ingredients might affect the microbial activity of foods. MVG

FERMENTED FOOD

- 2075 EL-GENDY (SM). Fermented foods of Egypt and the Middle East. *J. Food Prot.* 46(4); 1983; 358-67
- Discusses preparation, quality of sour milk (*Laban Rajeb* and butter milk); Karish cheese; mish cheese; Laban zeer; kisnic; zabady; shamsy bread; fermented dairy and other fermented foods of Sudan. BSN

ALGAE

- 2076 ANUSUYA DEVI (M) and VENKATARAMAN (LV). Functional properties of protein products of mass cultivated blue-green alga *Spirulina platensis*. *J. Food Sci.* 49(1); 1984; 24-7
- Water and fat absorption capacity, emulsification capacity (EC), foaming capacity (FC) and foaming stability (FS) of flour and protein concentrate of *Spirulina* cells were compared with those of soyabean meal both as a function of pH and NaCl concentration. Water and fat absorption capacities of *Spirulina* flour were 220 g and 190 g/100 g of sample respectively, those of soyabean meal were 230 g and 120 g/100 g of sample. Protein concentrate had a lower water absorption capacity, higher fat absorption capacity than its flour. It had higher EC and similar FC. *Spirulina* flour had similar EC and FC to that of soyabean meal. The FS of flour (18%) and protein concentrate (27%) was poor when compared to soyabean meal (55%). AA

BACTERIA

- 2077 BEERENS (H), CONDAMINES (JL), MOLLARD (JA), BAUDE (R) and RIDOUX (C). Comparison between lactose glutamic acid broth and brilliant green bile broth in the research of coliforms and fecal coliforms in food gelatin samples. *Sci. Aliment.* 3(3); 1983; 485-90 (French)
- In examining gelatin samples, the L.G.A. broth is superior to the brilliant green lactose bile broth for the detection of coliforms and fecal coliforms. Its sensitivity is approximately 4.6 times higher for coliforms and 2.6 times higher for fecal coliforms. AA

- 2078 MOLIN (G). The resistance to carbon dioxide of some food related bacteria. *European J. Appl. Microbiol. Biotechnol.* 18(4); 1983; 214-7

The relative growth inhibitory effect of 100% CO₂ was highest on *Bacillus cereus*, *A. hydrophila* and *V. frederiksenii* (67-52%) and lowest on *V. enterocolitica*, *Br. thermosphacta* and the *Lactobacillus* spp. KAR

LACTOBACILLUS

- 2079 EL-GENDY (SM), ABDEL GALIL (H), SHAHIN (Y) and HEGAZI (FZ). Acetoin and diacetyl production by *Lactobacillus casei* subsp. *pseudoplantarum*. *J. Food Prot.* 46(6); 1983; 537-41
- 2080 EL-GENDY (SM), ABDEL GALIL (H), SHAHIN (Y) and HEGAZI (FZ). Acetoin and diacetyl production by *Lactobacillus plantarum* able to use citrate. *J. Food Prot.* 46(6); 1983; 503-5

STREPTOCOCCUS

- 2081 REDDY (NS) and RANGANATHAN (B). Nutritional factors affecting growth and production of antimicrobial substances by *Streptococcus lactis* subsp. *diacetylactis* S₁-67/C. *J. Food Prot.* 46(6); 1983; 514-7, 521

MUSHROOM

- 2082 PIEPPONEN (S), LIUKKONEN-LILJA (H) and KUUSI (T). The selenium content of edible mushrooms in Finland. *Z. Lebensmittel-Unters. Forsch.* 177(4); 1983; 257-60
- 2083 SPERONI (JJ), BEELMAN (RP) and SCHISLER (LC). Factors influencing the agaritine content in cultivated mushrooms, *Agaricus bisporus*. *J. Food Prot.* 46(6); 1983; 506-9, 513
- 2084 VON DER HUDE (W) and BRAUN (R). On the mutagenicity of metabolites derived from the mushroom poison gyromitrin. *Toxicology.* 26(2); 1983; 155-60
- The hepatotoxic and carcinogenic hydrazine N-methyl-N-formyl hydrazine (MFH), which is formed from the mushroom poison gyromitrin by hydrolytic cleavage *in vivo* and *in vitro* during food processing is much more mutagenic for the strain TA 100 of *Salmonella typhimurium* in the presence of a metabolic activation system than in its absence. On the other hand, acetylated MFH (Ac-MFH) was not mutagenic for TA 100 in both test conditions. For the strain TA 98, neither MFH nor Ac-MFH were mutagenic both with and without metabolic activation. Therefore, a metabolic conversion of the free NH₂-moiety of MFH into a genotoxic metabolite of MFH is postulated. AA

FOOD ADDITIVES

- 2085 McCORMICK (RD). The pH factor: choosing the optimum acidulent. *Process Prepared Food.* 152(4); 1983; 106-7, 110, 113

- 2086 JAY (JM), RIVERS (GM) and BOISVERT (WE). Antimicrobial properties of - dicarbonyl and related compounds. *J. Food Prot.* 46(4); 1983; 325-9
- 2087 VIPLAVA PRASAD (U) and PRAKASA SASTRY (CS). Spectrophotometric determination of some permitted food colours using Aliquat 336. *J. Food Sci. Technol. (India)* 20(6); 1983; 263-4
- A spectrophotometric method for the determination of food colours (Amaranth, Ponceau 4R, Fast Red E, Carmoisine, Sunset Yellow FCF, Tartrazine and Erythrosine) based on their ability to form water insoluble and chloroform soluble complexes with aliquat 336 (methyl tricaprylyl ammonium chloride) has been reported. Microgram quantities of food colours could be determined and presence of glucose, sucrose, sulphate, phosphate, citric acid, ascorbic acid, tartaric acid and SO₂ even in large quantities do not interfere, but nitrite and nitrate of sodium and salicylic acid interfere even when present in < one fold of the dye concentration. KAR
- 2088 COX (EA), RICHFIELD-FRATZ (N), BAILEY (CJ) and ALBERT (RH). Liquid chromatographic determination of intermediates, subsidiary colours, and two reaction by-products in FD & C Yellow No.6: Reverse phase method. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 240-49
- A reverse phase liquid chromatographic method for determining sulphanilic acid, Schaffer's salt, 4,4'-(diazamino)-dibenzenesulphonic acid, 6,6'-oxybis(2-naphthalene sulphonic acid) and 6-hydroxy-5-(phenylazo)-2-naphthalene sulphonic acid has been reported. Data on recoveries from specific levels added to FD & C Yellow No. 6 have been presented and discussed. JVS
- 2089 BAILEY (JE) Jr. Reverse phase liquid chromatographic screening procedure for parts-per-million levels of *P*-toluidine in D & C Red No. 6 and D & C Red No. 7. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 250-54
- The stationary phase used was octylsilanised silica gel, the mobile phase being aqueous acetonitrile solution containing ammonium sulphate-sulphuric acid electrolytes (pH 2). Limit of determination was 1.9 ppm. Recovery of *P*-toluidine from D & C Red No. 4 was 91.8% and from D & C Red No. 7 was 94.6%. JVS

CEREALS

- 2090 POMERANZ (Y). Grain quality standards. *Getreide Mehl Brot.* 37(7); 1983; 202-6 (German)
- Present proposals for the revision of U.S. quality standards - originally issued in 1916 - for cereals and legume grains (especially soya) have been discussed, in the context of : (i) wheat standards of the People's Republic of China; (ii) premia paid for quality wheats and durum wheats in the USSR; (iii) standards for Canadian "Red Spring Wheat"; (iv) standards for U.S. wheats; (v) quality characteristics of flour for the manufacture of bread, biscuits, and paste goods; and (vi) methods for determining the quality of bread wheats. A new set of standards for wheat has been proposed. KMD
- 2091 NORMAND (FL), ORY (RL), MOD (RR), SAUNDERS (RM) and GUMBMAN (MR). Influence of rice hemicellulose and α -cellulose on lipid and water content of rat feces and on blood lipids. *J. Cereal Sci.* 2(1); 1984; 37-42

Faecal output was higher in rats fed 3% microcrystalline cellulose than in those fed 3% hemicelluloses. Faecal water as well as faecal lipid contents were highest in rats fed hemicelluloses than in controls receiving fibre free diets. JVS

- 2092 CHOUVEL (H), CHAY (PB) and CHEFTEL (JC). Enzymatic hydrolysis of starch and cereal flours at intermediate moisture contents in a continuous extrusion reactor. *Food Sci. + Technol.* 16(6); 1983; 346-53

Pre-gelatinized corn starch, and pre-gelatinized wheat and corn flours have been liquefied continuously in an extruder, using a thermostable α -amylase. By using a special, long-barrel, twin-screw extruder, with α -amylase introduction at mid-barrel, it was possible to carry out the combined, sequential gelatinization and liquefaction of raw corn starch in a single passage. Finally, extruded hydrolysates were further saccharified with glucoamylase. Glucose syrups of high dry solids and glucose contents were obtained within a few hours after extrusion. Thus, extrusion-liquefaction with α -amylase is useful as a first step in the rapid production of "predigested" fermentation substrates. KMD

- 2093 WIESSER (H) and BELITZ (H-D). Positions of bitter peptides from zeins within the total amino acid sequences. *Z. Lebensmittel-Unters Forsch.* 177(3); 1983; 205

- 2094 GOODWIN (BFJ) and RAWCLIFFE (PM). Food allergies associated with cereal products. *Food Chem.* 11(4); 1983; 321-38

The isolation and chemical identification of allergens and toxic fractions from cereal proteins is reviewed along with the current views on the mechanism of coeliac disease. KAR

RICE

- 2095 RAMARATHNAM (N) and KULKARNI (PR). Effect of aging on the fatty acid composition of some Indian varieties of brown rice. *J. Food Sci. Technol. (India)* 20(6); 1983; 284-7

10 varieties of paddy were loosely tied in gunny bags and stored at room temperature for 120 days and the lipid content (palmitic, oleic, and linoleic) were examined at 30-day intervals. Total lipid content of all the varieties remained constant during the entire storage period. The levels of palmitic, and oleic acids decreased while linoleic acid increased in all the varieties during storage. Basmati-257 variety had the maximum oleic acid content. Traces of capric, lauric, myristic, stearic, linolenic and arachidic acids were also detected; arachidic acid disappeared in all varieties during storage except in one variety; at the end of 20 days storage, lauric acid could be detected in 3 varieties and capric acid in 4 varieties. KAR

- 2096 PAULOSE (MM), VENKOB RAO (S) and LAKSHMINARAYANA (G). Rice bran oil: Status and prospects. *J. Oil Technol. Assoc. India.* 15(3); 1983; 56-60

This is an overall report on a seminar held at Hyderabad on 13th August, 1983, on the subject. It summarizes the present situation of the rice bran oil industry in India, and deals, in some detail, with the following processing aspects: stabilization, solvent extraction, deacidification and refining, dewaxing, hydrogenation. Other aspects covered are: specifications, R&D needs, and Government policies. KMD

- 2097 LAKSHMINARAYANA (T), AZEEMODDIN (G) and THIRUMALA RAO (SD). Edible grade rice bran oil. *Res. Ind.* 28(3); 1983; 167-9
- Rice bran oil extracted within 24 hour of the production of bran has been refined by the standard AOCS cup method (laboratory) and by centrifugal method (pilot plant). The refining losses are: 42% for un-dewaxed oil, 36% for un-dewaxed oil using molasses as co-additive with alkali, 31% for dewaxed oil in all laboratory scale experiments and 31% in the centrifugal method. The characteristics of refined and bleached rice bran oil correspond to Indian Standard Specifications for refined rice bran oil (edible grade). BSN

WHEAT

- 2098 MILLET (E) and PINTHUS (MJ). The association between grain volume and grain weight in wheat. *J. Cereal Sci.* 2(1); 1984; 31-5
- Between 15 and 20 days of anthesis, a linear increase in grain weight was noticeable. At this juncture, the grain volume had already reached the major part of final value and the structure of grain coat had also been established. The rate of dry matter accumulation and increase in grain volume were higher in heavy-grained cultivars than in light-grained cultivars. JVS
- 2099 WRIGLEY (CW), DU CROS (DL), FULLINGTON (JG) and KASARDA (DD). Changes in polypeptide composition and grain quality due to sulphur deficiency in wheat. *J. Cereal Sci.* 2(1); 1984; 15-24
- Quantitative and qualitative differences in protein composition of 12 samples of flour of *Olympic* (cultivar) wheat grown under a wide range of sulphur and nitrogen applications have been examined. Sulphur deficient samples were found to contain greater amounts of high molecular weight polypeptides and this feature was associated with greater toughness and decreased extensibility of dough. JVS
- 2100 TANEJA (S), GUPTA (K), WAGLE (DS) and DHINDSA (KS). Biological evaluation of wheat varieties. *J. Food Sci. Technol. (India)* 20(6); 1983; 319-20
- 4 varieties of wheat (WH-147, WH-157, WH-283 and WH-291) were evaluated on the basis of proximate composition for chapati making and for protein efficiency ratio (PER). The range of values (%) for proximate composition are: moisture 7.88-8.96, ash, 1.43-1.88, crude protein 10.11-11.77, ether extract, 1.74-2.93, crude fibre 0.98-1.49 and N free extract 74.00-78.20. Ca and P contents ranged from 88.8 to 119.1 and 274.35-349.41 mg/100 g respectively. PER ranged from 1.99 to 2.46. Water absorption, which is an indicative of chapati making quality ranged from 64 to 72%. Although all the varieties proved good for chapat making, WH-283 is an outstanding variety for chapati making. KAR
- 2101 BRUGGEMANN (J), OCKER (H-D) and ZWINGELBERG (H). Milling conditions for the reduction of toxic heavy metals in wheat. *Getreide Mehl Brot.* 37(6); 1983; 168-72 (German)
- When a heavily contaminated batch of grain was polished (4-6%) in a laboratory polisher, the cadmium, content was reduced by 5-10%, nickle content by about 15%, and lead content by about 50%. The best decontamination (more than 50%) was produced by milling to produce low-ash flours of the types 405 and 550. In the flour types 812 and 1050, which are richer in ash, the decontamination ranged between 35 and 40%. Conversely, there was a concentration of heavy metals in the late fractions and in the bran. KMD

- 2102 SPICHER (G) and ZWINGELBERG (H). Behaviour of the microflora of durum wheat during pearling. *Getreide Mehl Brot*. 37(6); 1983; 185-9 (German)

Durum wheat was polished in a laboratory polishing machine. This treatment removed about 2 to 4% of the outer peel of the grain, and also reduced the microbial contamination (bacterial and mould count) present on the grain surface. This result was reflected in the milled products also. Wetting of the durum wheat for 30 minutes so that the moisture content increases by 1%, increases the aforesaid effect, probably because of the better separation of the outer layers and the micro-organisms adhering thereto. A 4% polish is recommended as it results in a higher yield of semolina. KMD

- 2103 WILLIAMS (PC), PRESTON (KR), NORRIS (KH) and STARKEY (PM). Determination of amino acids in wheat and barley by near-infrared reflectance spectroscopy. *J. Food Sci.* 49(1); 1984; 17-20

In this demonstration with NIR spectroscopy, using 2nd derivative mathematical treatments of log I/R data of ground wheat samples on a computerised spectrophotometer, it was possible to predict the concentration of lysine, threonine, tryptophan and methionine. With barley, low standard error of prediction were obtained for 13 amino acids using a research NIR and a commercial instrument. In both these instruments, 1st derivative mathematical treatments of spectral data gave best accuracy. MVG

- 2104 BATEY (IL) and GRAS (PW). Effects of using defatted gluten as a substrate for solubilization with sodium hydroxide. *J. Food Technol.* 19(1); 1984; 109-14

- 2105 BIETZ (JA). Analysis of wheat gluten proteins by high-performance liquid chromatography. Part I. *Baker's Dig.* 58(1); 1984; 15-7, 20-21, 32

The review article covers aspects like what is HPLC, SE (size-exclusion) HPLC of gluten proteins, typical conditions for SE-HPLC, including preparation of sample, analysis of gliadins, studies on gluten sub-units, study of native glutenins, prediction of quality and application of SE-HPLC in cereal science. KAR

- 2106 BURNOUF (T) and BIETZ (JA). Reversed-phase high-performance liquid chromatography of durum wheat gliadins: Relationships to durum wheat quality. *J. Cereal Sci.* 2(1); 1984; 3-14

Gliadins extracted from durum wheats were analysed by using RP-HPLC. Four fractions eluted by using different concentrations of acetonitrile could be used to distinguish two durum varieties. Two of the fractions (whose proteins had been purified) were found to contain gliadin bands 45 or 42 which had been shown to be associated with gluten strength and weakness respectively. A rapid RP-HPLC technique was developed to screen durum wheats with weak gluten. By using this technique each determination is reported to take 10 minutes. JVS

- 2107 LAIGNELET (B). Oxidations during the mixing of durum wheat semolina. *Sci. Aliment.* 3(3); 1983; 469-84 (French)

Water-soluble fraction (WSF) of durum wheat semolina was able to modify the colour and the cooking quality of pasta products. WSF presented a high lipoxigenase activity. The properties of WSF and its involvement in the oxidation of dough were studied during the mixing with a Brabender Farinograph. It was shown that WSF, particularly lipoxigenase, appears to be a very effective system for the oxidation of carotenoid pigments in order to maintain the gluten at a unoxidized state, unfavourable to the cooking quality by means of competition for available oxygen. AA

- 2108 CHANDRASHEKARA (S) and SHURPALEKAR (SR). Some chemical, pasting, rheological and textural characteristics of composite flours based on wheat and tubers. *J. Food Sci. Technol. (India)* 20(6); 1983; 308-12

Cassava and potato flours were blended at levels of 5-25% with wheat flour and the pasting and dough characteristics were evaluated by viscograph, farinograph, extensograph and texturometer studies prior to baking studies. The wide variation in the damaged starch content in potato (31.3%), cassava (4-8%) and wheat (11-4%) flours caused significant variation in the rheological, textural and handling properties of the dough. Cassava flour had low diastatic activity of 130 mg maltose/10 g flour compared to 299 mg maltose/10 g flour for wheat. Even a low level of cassava flour caused a steep rise in viscosity, steep break down and a negative set back. A dough consistency of 500 B.U. was optimum for wheat-cassava flour blends at all levels, whereas a dough consistency of 600 B.U. was needed for proper handling of wheat-potato flour blends. At the same level of blending, the changes in farinograph characteristics were greater with potato flour than with cassava flour. Wheat-potato flour blend took more time for dough development than wheat-cassava flour blends. The band width of farinogram was not affected in wheat-cassava flour blends (50 B.U.), while the band width narrowed down from 50 to 15 B.U. as the potato flour level increased from 0-25%. Potato flour, even at low levels (5%) brought about highly significant changes in extensograms by lowering the resistance to extension which was observed at 20% level in wheat-cassava flour blends. Compressibility and cohesiveness of doughs remained almost unaltered by blending with tuber flours. Potato flour increased the adhesiveness of blends. KAR

- 2109 RONALDS (JA), O'BRIEN (L) and ALLEN (SJ). Determination of the proportion of acetic acid-insoluble protein in wheat flours by alkaline steam distillation. *J. Cereal Sci.* 2(1); 1984; 25-9

Alkaline steam distillation has been shown to provide accurate estimates of protein contents of flours and flour extracts. The proportion of insoluble (residue) protein can be derived from these values. The results correlated well with Kjeldahl values. JVS

- 2110 MULLER-MULOT (W), ROHRER (G), OESTERHELT (G), SCHMIDT (K), ALLEMANN (L) and MAURER (R). Finding of α - β - and γ - dehydrotocopherol in wheat germ oil by HPLC and GC/MS - A contribution to tocopherol analysis. *Fette Seifen Anstrichm.* 85(2); 1983; 66-72 (German)

Fractions of β -tocotrienol/ γ -tocopherol isolated from commercial wheat germ oils by preparative TLC were separated once more by HPLC. Three dehydrotocopherols (α -, β - and γ -) were found and identified by GC/MS. HPLC-retention data for plastochromanol-8 in these and corresponding fractions of latex (*Hevea brasiliensis*) could be ascertained. The hypothetical 5.7 dimethyltocotrienol could not be found neither in the equivalent fractions of wheat germ oil and latex nor in those of crude palm oil. AA

MILLETS

SORGHUM

- 2111 CHANDRASHEKAR (A) and DESIKACHAR (HSR). Sorghum quality studies. Part I. Rolling quality of sorghum dough in relation to some physico-chemical properties. *J. Food Sci. Technol. (India)* 20(6); 1983; 281-4

Roti was prepared from 45 varieties of sorghum (*Sorghum bicolor* Monech.) and the rolling quality of dough, dough texture and water uptake and visco-graphic studies were conducted. Varieties showing good rolling property showed lower gelatinization temperature higher peak viscosities and higher set backs in the Brabender viscograph. Significant correlation was found between the texturometer values and the rolling score. Varieties showing good, moderate and poor rolling quality have been listed. Water uptake values at 70 C could be correlated with the rolling quality scores, but not at 60 C. Amylose, protein and prolamine content of flour had no relation to roti rolling quality. Water uptake was higher at 70 C than at 60 C which is correlated to starch damage in flour. KAR

MAIZE

- 2112 ABDEL-RAHMAN (AHY). Improvement of nutritive value in corn for human nutrition. *Food Chem.* 13(1); 1984; 17-23

Corn was steam cooked at a pressure of 5 psig (108.3 C) for 15, 30 and 60 minutes and the cooked grain was dried, ground and analysed chemically. Reducing sugars, sucrose, starch, lysine and niacin were altered by the cooking procedure. The same corn variety was germinated at 25 C for 5 days. Germinated and non-germinated seeds were not separated, but were dried and analysed together. Protein, ether extract, free fatty acids, crude fibre, starch, sucrose, reducing sugars, thiamin, riboflavin, niacin, lysine and tryptophan were altered significantly. Germination improved the nutritional quality of corn and is less expensive than heat treatment. AA

- 2113 GOMEZ (MH) and AGUILERA (JM). A physicochemical model for extrusion of corn starch. *J. Food Sci.* 49(1); 1984; 40-43, 63

The model system based on the combination of raw, gelatinised and dextrinised starch was proposed to represent the physicochemical properties of extruded starch. A study of physicochemical properties of corn starch extruded at various moisture levels showed that maximum gelatinisation occurred at 28.9% moisture and below 20% moisture, dextrinisation becomes predominant during high shear cooking-extrusion. The usefulness of the model was confirmed by scanning electron micrographs. MVG

- 2114 BURG (WR) and SHOTWELL (OL). Aflatoxin levels in airborne dust generated from contaminated corn during harvest and at an elevator in 1980. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 309-12

PULSES

BEAN

- 2115 DURAN (L), CLEMENTE (G) and CALVO (C). Quality of canned dry beans. II. Establishing objective limits for texture. *Rev. Agroquím. Tecnol. Aliment.* 23(3); 1983; 395-400 (Spanish)

Instrumental measurement of previously selected (Duran and Calvo, 1982, *Rev. Agroquím. Tecnol. Aliment.*, 22(2); 271-281) textural parameters of canned dry beans was studied. Hardness was measured by shearing the whole grains

skin consistency by shearing the skins and graininess by extrusion of the peeled grains. Results show that measurement of each of the two first parameters in an Instron UTM adequately reproduces sensory evaluation. Instrumental limits corresponding to minimum levels for sensory acceptance were established for each parameter. AA

- 2116 REDDY (NR), PIERSON (MD), SATHE (SK) and SALUNKHE (DK). Chemical, nutritional and physiological aspects of dry bean carbohydrates. A review. *Food Chem.* 13(1); 1984; 25-68

The current understanding of dry bean carbohydrates related to their composition, nutritional value and physiological attributes in humans is reviewed. Molecular, physical and chemical properties of legume starches are also discussed. Data to indicate the possible involvement of the raffinose family of oligosaccharides in flatulence production are given. KAR

- 2117 BENDER (AE). Haemagglutinins (Lectins) in beans. *Food Chem.* 11(4); 1983; 309-20

Lectin content of a number of legumes, like lentils (Red and green), peas (Garden, green and yellow) black eye beans, kidney beans (red and white) is given. Rat growth studies were done with raw kidney beans and cooked white and red beans. Extent of destruction of lectin by heat, especially while cooking as also the effect of heating red kidney beans for 20 minutes at 70/80 C have been studied and the results reported. KAR

FRENCH BEAN

- 2118 BUERA (MP), PILOSOF (AMR) and BARTHOLOMAI (GB). Kinetics of trypsin inhibitory activity loss in heated flour from bean, *Phaseolus vulgaris*. *J. Food Sci.* 49(1); 1984; 124-6, 136

The effect of temperature, time and moisture content on trypsin inhibitory activity of bean flour was studied. Trypsin inhibitory activity loss followed first-order reaction kinetics and the rate of loss was greatly increased with increasing moisture content of flour from 2-55%. Activation energies for the first-order reaction constants were calculated and ranged between 13-27 Kcal/mole, showing a maximum value at 30% moisture content. AA

MUNG BEAN

- 2119 THOMAS (M), LEELAMMA (S) and KURUP (PA). Effect of dietary carbohydrate on cholesterol lowering action of black gram fiber. *Indian J. Biochem. Biophys.* 21(2); 1984; 148-50

Cholesterol lowering action of black gram fiber, using different carbohydrates like glucose, sucrose and corn starch in the diet, has been studied in rats. The cholesterol lowering action was maximum when corn starch was fed and minimum when sucrose was fed. Corn starch and fibre also gave highest concentration of bile acids in the liver and fecal excretion of neutral sterols and bile acids; these were lowest in rats fed sucrose and fibre. MVG

BROAD BEAN

- 2120 EL-TABEY SHEHATA (AM), ABU-BAKR (TM) and EL-SHIMI (NM). Phytate, phosphorus and calcium contents of mature seeds of *Vicia faba* L. and their relation to texture of pressure-cooked faba beans. *J. Food Process. Preserv.* 7(3); 1983; 185-92

Wide variations were found in phytic acid, phosphorus and calcium contents among the samples of the same variety and from one year to another. Phytic acid and total phosphorus were concentrated in the decoated seeds while calcium was concentrated in the seed coats. Inorganic phosphorus represented a very small fraction (2 to 4%) of the total phosphorus. However, the mean value of phytate phosphorus constituted about 30% and 40% of the total phosphorus of decoated seeds and seed coats, respectively. A highly significant correlation was found between the total phosphorus and phytate phosphorus contents of decoated seeds. A positive significant correlation between phytic acid content and texture of cooked beans was found for samples of the 1980 crop, but not for samples of the 1981 crop. No significant correlation was found between the phytic acid/Ca ratio and the texture of cooked faba beans. AA

CHICK PEA

- 2121 USHA CHANDRASEKAR, GEETHA (G) and SHANTI (V). Effect of raw and roasted Bengal gram on some physiological parameters in albino rats. *Indian J. Nutr. Dietet.* 20(2); 1983; 40-45

COW PEA

- 2122 LONGE (OG). Varietal differences in chemical characteristics related to cooking quality of cow pea. *J. Food Process. Preserv.* 7(3); 1983; 143-50

Thirteen cow pea varieties were tested for soaking rate and cooking quality. The rate of water imbibition was not related to cooking time. Cooking time varied between 41.5 and 135 minutes. Cooking resulted in losses of 5.2-69.5% for calcium, 13.9-33.3% for magnesium, 12.6-22.2% for phytic acid and 45.7-63.1% for pectin. Among the chemical characteristics measured, only phytic acid content was moderately correlated with cooking time. AA

HORSE GRAM

- 2123 SHINDE (GB) and CHAKRABARTI (CH). An individual and combined supplementary effects of some essential amino acids and B-vitamins on the nutritional parameters of autoclaved horse gram (*Dolichos biflorus*) protein in male albino rats. *Indian J. Nutr. Dietet.* 20(3); 1983; 80-94

PEA

- 2124 RICE (P) and SELMAN (JD). Apparent diffusivities of ascorbic acid in peas during water blanching. *J. Food Technol.* 19(1); 1984; 121-4
- By sufficient agitation of blanch water during water blanching of peas, surface resistance becomes negligably small and the resistance to the loss of

ascorbic acid is by a diffusion mechanism within the pea. Thus, a quantitative approach to the assessment of ascorbic acid loss, by means of the evaluation of an apparent diffusion coefficient (D_a) becomes possible. BSN

PIGEON PEA

- 2125 RAMAKRISHNAIAH (N) and KURIEN (PP). Variabilities in the dehulling characteristics of pigeon pea (*Cajanus cajan* L.) cultivars. *J. Food Sci. Technol.* (India) 20(6); 1983; 287-91

18 pigeon pea varieties and one commercial variety were moisture equilibrated for 3 weeks and used for milling. Aspects studied included thousand grain weight, husk, and cotyledon contents, extent of dehulling, and effect of moisture and temperature of premilling heat treatment on degree of dehulling of grains. Thousand grain weight varied from 70.9 to 191.6 g; the grains were nearly spherical. The range of values for husk content was 10.5-15.5%; cotyledon content was 83.4-88.9% and germ content was 0.6-1.3%. During conditioning (heating at 120 C for 2 minutes followed by tempering in insulated boxes) the moisture content reduced from 10.6-13.0 to 6.2-7.2 %. Depending upon the variety, 67 to 94.2% dehulling was achieved except in one variety where it was 100%. Size of the grain does not influence dehulling. KAR

WINGED BEAN

- 2126 RAVINDRAN (G) and PALMER (JK). Polysaccharides of winged beans (*Psophocarpus tetragonolobus* (L.) DC), variety TPT-2. *J. Food Sci.* 49(1); 1984; 70-71, 74

The variety studied contained little or no starch. The defatted and partially deproteinised flour yielded on hot water extraction, soluble (11%) and insoluble (28%) polysaccharide (PS) fractions. Soluble polysaccharides, on fractional precipitation, yielded a predominant fraction (I) containing 96% PS, and a minor fraction (II) containing 81% PS. The insoluble fraction yielded 72% PS. The remainder in fraction II and insoluble fraction constituted protein, ash and lignin. Fraction I PS consisted mostly galactan (76%) and uronic acid (18%) while fraction II PS contained mostly arabinogalactan and uronic acid (18%). Insoluble PS contained predominantly cellulose (41%), galactan (25%), xylan (14%) and acidic PS (15%). MVG

OILSEEDS AND NUTS

ALMOND

- 2127 GOMEZ (B), BURLO (F), GOMEZ (I) and MATAIX (J). Mineral content of the vegetable by-product constituted by the mesocarpium-epicarpium of the almond fruit (*Prunus amygdalus* L.). *Rev. Agroquim. Tecnol. Aliment.* 23(3); 1983; 439-42 (Spanish)

The content of N, P, K, Ca, Mg, S and Na in the epicarpium-mesocarpium of the *Prunus amygdalus*, L. fruit has been measured, and the results compared with the content of the same elements in organic fertilizers. The content of N, P, Ca, Mg, and S is similar in both, while Na is moderately higher, and K

is higher in the almond by-product. The relations C/N and N/P obtained from the mean values are within the limits considered appropriate for the mass fermentation of compost. AA

COCONUT

- 2128 ANON. Coconut survey on production and marketing. *Profodcil Bull.* 18(1); 1983; 3-13

A survey has been presented covering the area and distribution, productivity per hectare in Kerala, Karnataka and Tamil Nadu, products, like edible copra, coconut oil, oil cake, coir, dessicated coconut, coconut protein and other products, shell products and coconut stem and their utilisation. The constraints confronting the industry are also discussed as well as the various programmes initiated by the Government to improve the coconut industry and the export trade of its products. Some statistics regarding world coconut production is also given. KAR

GROUNDNUT

- 2129 OUPADISSAKOON (C) and YOUNG (CT). Modeling of roasted peanut flavour for some Virginia type peanuts from amino acid and sugar contents. *J. Food Sci.* 49(1); 1984; 52-8

Descriptive terminology were developed for roasted peanut flavour using profile technique. Samples of roasted peanut were evaluated using, the critical Laboratory Evaluation Roast (CLER) method and flavour profile panel of mathematical models developed for predicting both CLER scores and flavour ratings for flavour profile with that having an R^2 of 0.969, was the test among 10 variables examined. For predicting CLER score from raw peanut data only a good fit ($R^2 = 0.762$) was obtained. Similarly, the best 10 variables model for predicting roasted peanuts flavour had an R^2 of 0.928. MVG

- 2130 SALAZAR (AJ) and YOUNG (CT). An azomethine H automated method for boron determination in peanuts. *J. Food Sci.* 49(1); 1984; 72-4

The automated colorimetric method comprises of condensing boron in trichloroacetic acid (TCA) extracts of roasted peanuts with azomethine H, which is prepared *in situ* as the condensation product of the H acid (8-amino-1-naphthol-3,6-disulphonic acid) and salicylaldehyde, and measuring the absorbance of the resulting yellow chromophore spectrophotometrically at 420 nm. The method can analyse 45 samples in one hour over the range 1-10 ppm and the results agree with those obtained by the manual curcumin method. MVG

- 2131 TOSCH (D), WALKING (AE) and SCHLESIER (JF). Comparison of liquid chromatography and high performance thin layer chromatography for determination of aflatoxin in peanut products. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 337-41

HPTLC was found to compare well with LC in respect of sensitivity, accuracy and linearity of response for estimating aflatoxin in peanut butter. JVS

- 2132 GREHAIGNE (B), CHOUVEL (H), PINA (M), GRAILLE (J) and CHEFTEL (JC). Extrusion cooking of aflatoxin containing peanut meal, with and without addition of ammonium hydroxide. *Food Sci. + Technol.* 16(6); 1983; 317-22

Peanut meals containing an average of 250 μg aflatoxin B₁ per kg dry weight, were continuously processed in a twin-screw extruder, in the presence of 0-2.5% ammonium hydroxide. During extrusion, moisture content varied between 11.5 and 38%, the flow rate between 22.5 and 30 kg weight/h, and the

temperature between 140 and 185 C. The speed of rotation of the screw was 29-30 r.p.m. This experiment failed to answer the questions whether extrusion causes destruction of the aflatoxin molecules, or their binding to peanut meal constituents. KMD

- 2133 CAMPBELL (AD), FRANCIS (OJ) Jr., BEEBE (RA) and STOLOFF (L). Determination of aflatoxins in peanut butter, using two liquid chromatographic methods: Collaborative study. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 312-6

A normal phase and reverse phase liquid chromatographic methods were studied by different collaborators for the determination of aflatoxin in peanut butter. Intra-laboratory precision of the 2 methods was better than current AOAC methods; inter-laboratory precision was, however, not better. In past, the reverse phase method showed some evidence of measuring interferences also. JVS

SOYABEAN

- 2134 GROVER (U), SURJAN SINGH and MITAL (BK). Studies on extending the shelf life of soyabean curds. *J. Food Sci. Technol. (India)* 20(6); 1983; 298-301

Soyabean curd pieces (5 x 5 x 3 cm) were stored in water or aqueous solutions of 2% citric acid, 5% NaCl solution or a combination of both for 24 hours and at 5 or 30 C for 30 days. Pieces of curd (2.5 x 1.0 x 1.0 cm) were also deep fat fried at 180 C for 4 minutes and stored for 18 days at 5 or 30 C. The chemical composition and microbiological status of the stored product were evaluated. The acceptability of soyabean curd in 5% NaCl solution was upto 6 days, whereas at 30 C it was one day. Citric acid extended the shelf life of curd upto 15 days at 5 C and at 30 C for 6 days. In the NaCl and citric acid mixture, the shelf life was 18 days at 5 C and 6 days at 30 C. Deep fat fried curd stored at 5 C was acceptable upto 12 days. KAR

WALNUT

- 2135 SRINIVASAN (PS). About walnuts and peanuts. *Indian Food Packer.* 38(1); 1984; 32-6

Review covers: world production; walnut production in India; composition of Indian walnut, marketing; and trade; quality control and preshipment inspection; exports from India and world trade; and import of walnuts by major consumers. BSN

TUBERS AND VEGETABLES

- 2136 SARKAR (SR), SINGH (LR), UNIYAL (BP), MUKHERJEE (SK) and NAGPAL (KK). Effect of common vegetables on thyroid function in rats. A preliminary study. *Def. Sci. J.* 33(4); 1983; 317-21

POTATO

- 2137 LENART (A) and FLINK (JM). Osmotic concentration of potato. I. Criteria for the end-point of the osmosis process. *J. Food Technol.* 19(1); 1984; 45-63

Significant increase in the water activity was observed by rinsing the potato surface after osmotic concentration, as it led to reduction of solids and soluble solids concentration in the potato. The optimal condition for an equilibrium osmosis with sucrose would be, 50% solution at a solution/solid ratio of 4. Thus, 75% of soluble solids in the equilibrated potato comes from the osmosis solution. Mixed sucrose-salt solutions gave a greater decrease of water activity than the pure sucrose solution, even though the mass transport data are similar. For calculation of mass transport data and water activity for osmotic concentration to equilibrium in sucrose solution for the concentration range of 10-70% and solution/solids range of 1-10, a model has been developed. Mass transport data with an average error <4% may be calculated, and also water activity predicted for osmosis concentration processes. BSN

- 2138 LENART (A) and FLINK (JM). Osmotic concentration of potato. II. Spatial distribution of the osmotic effect. *J. Food Technol.* 19(1); 1984; 65-89

Spatial distribution of solids and moisture is governed by several factors like solute type, solution concentration, osmosis time, osmosis temperature and solution agitation. Two terms characterised spatial distribution, namely depth of penetration of osmosis and moisture content of the surface relative to initial moisture content. Observed behaviour for osmosis in concentrated sucrose solution, has been explained with the aid of a model. Osmosis in salt solution being different from that of sucrose solution; sucrose/salt mixtures tend to show behaviour characteristics typical for osmosis in each of the pure solutes. The improved osmotic behaviour and potato quality obtained for osmosis in mixed sucrose-salt solutions with sucrose concentrations above 40% have been discussed. BSN

- 2139 JANAVE (MT) and NAIR (PM). Partial purification and properties of diamino-pimelate decarboxylase from γ -irradiated potatoes. *Indian J. Biochem. Biophys.* 21(2); 1984; 113-6

When potatoes were gamma-irradiated at sprout inhibiting dose level, the diaminopimelate decarboxylase was activated four-fold. This activation was dose dependent and 10-25 krad gave maximum activation. When the enzyme was partially purified, it showed absolute requirements for pyridoxal phosphate; the optimum concentration of substrate and cofactor were 1.5 mM and 0.066 mM respectively. The enzyme was temperature sensitive and the temperature optimum was 45-50 C. There was 35% loss in activity when the enzyme was incubated for 5 minutes even at 30 C. The cofactor (pyridoxal phosphate) provided better protection against heat denaturation than the substrate. The enzyme was completely inhibited by carbonyl reagents at 1 mM, but metal chelating agent gave only 50% inhibition at the same concentration SH-inhibitors also inhibited the enzyme. The enzyme was inhibited by heavy metal ions like Cu^{2+} and Hg^{2+} ; 0.3 mM concentration gave 50% inhibition. Fe^{3+} activated the enzyme and at 5 mM concentration gave 1.6-fold activation of lysine formation. MVG

- 2140 KOZEMPEL (MF), SULLIVAN (JF) and CRAIG (JC) Jr. Effect of temperature on the model for blanching potatoes and other vegetables. *Food Sci. + Technol.* 16(6); 1983; 338-42

This study expands the leaching model for blanching potatoes, previously reported, to include the effect of blanch temperature. Although the diffusivity coefficient varies with temperature, we found it more accurate and practical to correlate the equilibrium constant in the model with temperature

and hold the diffusivity constant. With the adjustment, the model applies not only to the hot water blanching of potatoes, but also to water cooling. AA

- 2141 BUSHWAY (RJ), BUREAU (JL) and MCGANN (DF). Determination of organic acids in potatoes by high performance liquid chromatography. *J. Food Sci.* 49(1); 1984; 75-7, 81

The method has been developed to quantify major organic acids like oxalic, citric, malic, fumaric and ascorbic acid in potatoes. Ethanol-water-sulphuric acid (60:40:0.2) extracts (95%) of tubers were injected on an Aminex HPX-87 column with a mobile phase of 0.018N sulphuric acid. At 260 nm, ascorbic acid was detected. The other acids were quantified at 210 nm, when fructose was present at concentration lower than 6 mg/g with higher fructose concentration, 220 or 23 nm was required. The method gave more than 90% recovery and the results were very reproducible. Several potato varieties analysed by this method showed wide variation among themselves in acid content. MVG

- 2142 OSMAN (SF). Glycoalkaloids in potatoes. *Food Chem.* 11(4); 1983; 235-47

CASSAVA

- 2143 LANCASTER (PA) and BROOKS (JE). Cassava leaves as human food. *Econ. Bot.* 37(3); 1983; 331-48

Available information on the use of cassava leaf as food including its nutritive value, traditional consumption patterns and processing techniques and the leaf toxicity have been covered. KAR

- 2144 GOMEZ (G), VALDIVIESO (M), DE LA CUESTA (D) and KAWANO (K). Cyanide content in whole-root chips of ten cassava cultivars and its reduction by oven drying or sun drying on trays. *J. Food Technol.* 19(1); 1984; 97-102

Sun dried cassava chips for 48 hours and those on oven dried at 60 C for 24 hours showed reduced cyanide content to about 15-30% of initial cyanide content (100-900 mg/kg/dry matter). Further, free cyanide content accounted for nearly 60-80% of their total cyanide content in dried chips. BSN

- 2145 MOORTHY (SN). Effect of some physical and chemical treatments on cassava flour quality. *J. Food Sci. Technol.* (India) 20(6); 1983; 302-5

Cassava flour was subjected to oxidation with bromine and H_2O_2 , and treatments with orthophosphoric acid, perchloric acid, ammonia, trimethylamine and acetic, propionic, maleic and succinic anhydrides, mild fermentation and autoclaving to reduce the stickiness and to improve the organoleptic quality of Puttu (a traditional rice/tapioca flour steamed product) prepared from it. Of these, only orthophosphoric acid treatment improved the flour quality. Succinic anhydride improved the quality, but imparted a bitter taste to the product. KAR

CHUFA

- 2146 NAVARRO (JL), SCHWARTZ (M), GASQUE (F), ALBEROLA (J), PEREZ (R) and LAFUENTE (B). Seasonal composition of "chufa" tubers (*Cyperus esculentus* L.). *Rev. Agroquim. Tecnol. Aliment.* 23(3); 1983; 387-94 (Spanish)

The analytical characteristics of "chufa" tubers (*Cyperus esculentus* L.) were determined in five samples, harvested monthly, along October-February.

The average composition (d.m.) obtained is the following: residual moisture, 9.3%; starch, 33.38%; total sugars, 14.55%; ash, 1.67%; K, 5,025 ppm; Mg, 1,133 ppm, P. 211.5 mg/100 g; phospholipids, 616 mg/100 g; fat, 21.8%; fatty acids (relative percentage); C₁₄, 0.10; C₁₆, 12.64, C_{16:1}, 0.29; C₁₈, 2.29; C_{18:1}, 74.24, C_{18:2}, 9.57, C_{18:3}, 0.37; total nitrogen, 1.38%; total amino-acids, 5,502 mg/100 g; free aminoacids, 1,792.8 mg/100 g. AA

ALFALFA

- 2147 HARRISON (EJ) and VANDERSTOEP (J). Effect of germination environment on nutrient composition of alfalfa sprouts. *J. Food Sci.* 49(1); 1984; 21-3

TOMATO

- 2148 MURPHY (D). The non-sugar organic solids and lycopene contents of some Australian (Victorian) tomato sauces. *J. Assoc. Public. Anal.* 21 (Pt.1); 1983; 7-13

Out of the twenty five victorian tomato sauces examined, only two sauces showed non sugar organic solids content below the legal to minimum limit of 4%. When dried in a convection oven, the total solids content will be significantly lower as compared to data obtained from drying in either a steam or a vacuum oven. No significant correlation was observed between lycopene content and non sugar organic solids of tomato sauce. BSN

OKRA

- 2149 KALRA (CL) and PRUTHI (JS). Chemistry and Technology of Okra (*Hibiscus esculentus* Linn). *Indian Food Packer.* 38(1); 1984; 37-57

Review covers: nomenclature and distribution; production and export; harvesting; yield; quality criteria; skin coating; prepackaging and storage; physico-chemical composition; chemical composition of mucilage; economic/nutritional aspects physico-chemical composition of seeds and seed protein, amino acids, seed oil; hulls; processing technology including canning, blanching, addition of ascorbic acid, suitability of varieties for dehydration; freezing and steeping preservation; products from okra like curd and future research needs. BSN

FRUITS

- 2150 SINGH (IS) and DHAWAN (SS). Potentiality of various fruits for processing industry. *Indian Food Packer.* 37(3); 1983; 47-55.

Aspects covered include, quality components and production capacity of some mango, mandarin, lemon, guava and peach varieties suitable for processing. BSN

- 2151 VERMA (KK), JAIN (A) and RAWAT (R). Titrimetric determination of ascorbic acid using chloranil. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 262-5

The ascorbic acid is extracted from fresh fruit by adding a known quantity of thioureasulphite solution; the protein in the extract is coagulated

by adding trichloroacetic acid. The entire solution is filtered through suction and the filtrate is titrated with chloranil in the presence of hexamethylene tetramine in acetone-water. The estimation can be done photometrically also by appropriate initial adjustment of absorbance and its changes on addition of reagent till the end point is reached. JVS

BERRY

- 2152 BETTENFELD (M-L) and VOILLEY (A). Extraction and determination of sugars using high performance liquid chromatography in red fruit purees. Comparison with other methods. *Sci. Aliment.* 3(3); 1983; 439-50 (French)

Three different methods have been used for the estimation of oses and oligosides in the purees of frozen red fruits (strawberries and raspberries), viz: high performance liquid chromatography (HPLC), enzymatic estimation with a specific (glucose) electrode, and refractometry. A prior, selective extraction of the compounds to be analyzed is necessary in all these methods. The results obtained by HPLC and by the enzymatic electrode are equivalent; HPLC has the advantage of separating and estimating all the oses and oligosides simultaneously, while the enzymatic method is very rapid and very specific. Refractometry represents a rapid and very simple method, provided that the proportion of ethanol in the sample is known. The percentages of glucose and fructose in the strawberry and the raspberry have been determined; and compared with values given in the literature. KMD

RASPBERRY

- 2153 GUICHARD (E) and ISSANCHOU (S). Extraction of volatile compounds from raspberry by different methods. Application of principal component analysis to gas chromatographic data. *Sci. Aliment.* 3(3); 1983; 427-38

Data of flavour volatile compounds of the raspberry cultivar Lloyd George has been studied. By means of statistical method, we are able to compare three extraction methods : a nitrogen entrainment with trapping on Chromosorb 105, a vacuum distillation followed by extraction of the distillate with Freon 11 and a direct liquid-liquid extraction with Freon 11. The extracts obtained by the last method were analysed before and after a cold finger distillation step which eliminated non-volatile constituents. The two first principal components account for 87% of the total variation. The projection of the samples on the plane, spanned by these two components, shows that samples from the same extraction method are grouped and that the cold finger distillation performed on liquid-liquid extracts to remove pigments does not bring significant modification of the results. This study confirms that each method preferentially extracts some compounds. Nitrogen entrainment has the advantages of rapidity and reproducibility and preferably recovers monoterpenes (74.5%). Vacuum distillation method preferentially extracts alcohols (75%) and can be used for studying terpene alcohols which give a pleasant and intense flavour quality. On the contrary, liquid-liquid extraction method is less reproducible, but makes it possible to obtain fewer distortions between chemical classes and gives a better recovery of the ionones (13.9%) which are more characteristic of raspberry aroma. AA

STRAWBERRY

- 2154 CURZIO (OA), PICCINI (JL), QUARANTA (HO) and PEREZ (S). Influence of γ -irradiation on the total volatile acids content in strawberries. *Dtsch. Lebensmittel-Rundschau*. 79(6); 1983; 185-6

The volatile acid content of γ -irradiated (200 krad) strawberries reached a minimum value after 12 days of storage, while in the control samples the volatile acids reached a minimum after only 6 days of storage. Thus, γ -irradiation maintains the organoleptic quality of the fruit almost twice as long as that of the untreated fruits. The volatile acids index correlated well with the taste panel's assessment of both irradiated and non-irradiated strawberries. KMD

GRAPE

- 2155 CHAMBROY (Y) and FLANZY (C). CO_2 exchange in grapes under anaerobic conditions. 1. Methodology. *Sci. Aliment.* 3(3); 1983; 451-67

The anaerobic metabolism of grapes kept in an oxygen deprived atmosphere results in the production of carbon dioxide and ethanol. In order to accurately measure the CO_2 exchange a new methodology is developed. When the berries are kept in an atmosphere of carbon dioxide, there occurs an apparent absorption of CO_2 prior to the production phase. The characteristic parameters of this phenomenon, are the amount of CO_2 absorbed by the berries (Q_d) and the production rate of CO_2 during the steady phase (K_1). Atmospheres of argon and nitrogen specifically modify the anaerobic metabolism of grapes. AA

- 2156 HORVAT (RJ) and SENTER (SD). Identification of volatile constituents from scuppernong berries (*Vitis rotundifolia*). *J. Food Sci.* 49(1); 1984; 64-6, 81

- 2157 NARAYANA RAO (PVS) and SATYANARAYANA (G). Physico-chemical evaluation of certain grape varieties. *Andhra Agric. J.* 30(1); 1983; 53-4

Grape varieties from within the country and outside were studied for physical (100 berry weight and juice volume and percentage juice) and chemical (brix, total acids, soluble solids and acid sugar ratio). Of the 20 varieties, only Kata Kurgan was rated the best, closely followed by Mukhchilani. MVG

CITRUS

- 2158 CASAS (A). Chilling injury produced on citrus peel by refrigerated storage and transport. *Rev. Agroquim. Tecnol. Aliment.* 23(3); 1983; 321-36 (Spanish)

In this review, the hypotheses established about the mechanism of the chilling injury on fruits and vegetables are summarized. Then, the different factors affecting the susceptibility of citrus fruit peels to chilling injury are studied in detail, and the methods developed for reducing it are reviewed. AA

ORANGE

- 2159 ABBAS (MF), JASSIM (AM) and AL-TAHA (HA). The effect of ethephon on the ripening of Cv Mahaley orange. *J. Hortic. Sci.* 59(1); 1984; 127-9
- Cv Mahaley orange fruits were dipped in ethephon solutions of 0, 500, 1000 and 2000 ppm. At 1000 ppm, total soluble solids and TSS/acidity ratios significantly increased, and ripening was advanced by 10 days compared to controls. Ethephon treatment enhanced the level of carotenoids, but reduced chlorophyll levels. The number of days required by treated fruits to reach full colour was greatly reduced compared to controls. AA

MANDARIN

- 2160 BAL (JS) and CHOHAN (GS). A study on distribution and quality of different sized 'Kinnow' mandarin oranges harvested at optimum maturity. *J. Food Sci. Technol. (India)* 20(6); 1983; 321-2
- Kinnow mandarin oranges were harvested at optimum maturity during 1980 from a 11-year old tree and separated into 5 grades according to size and colour. Out of 1844 fruits, the gradewise % distribution of fruits were: A-19.08, B-44.75, C-21.74, D-11.77 and E-2.66. The range in values for other parameters were, fruit diameter 5.86-8.46 cm, fruit weight 129.53-254.66 g, peel % 28.88-31.53% and rag 19.93-20.11%. Peel thickness and vitamin C content increased with fruit size. The per cent content of juice ranged from 48.35 in A grade to 52.77 in B grade. Soluble solids to acid ratio was also maximum in B grade fruits. KAR
- 2161 MEHTA (U) and BAJAJ (S). Some studies on the suitability of Kinnow mandarin and Blood Red 'orange for comminuted squashes and their nutritional quality and storage behaviour. *J. Food Sci. Technol. (India)* 20(6); 1983; 305-8
- Squashes were prepared from Kinnow mandarin and Blood Red orange by (i) mixing 30% juice + 6% pulp + 4% peel or (ii) by pressure processing of whole fruit (comminuted squashes) and were evaluated for chemical composition, organoleptic properties and storage quality. Comminuted squashes contained higher amounts of ascorbic acid, carotenoids and flavonoids compared to control. During 9 weeks' storage at 37 C, ascorbic acid retention was 78% in comminuted kinnow squashes and 54-59% in comminuted Blood red variety which is higher than their respective control samples. Changes in colour, decrease in acidity, better retention of carotenoids and retention of flavonoids are almost same for both the varieties. Cloud stability of comminuted orange squashes was better than the control. Comminuted squashes from both the varieties were in good quality till 9 weeks of storage. Comminuted squashes prepared by I & II methods were rated superior to those prepared from juice alone. The slight bitter taste of comminuted squashes was acceptable by consumers, and it costed lesser than the squash prepared from juice alone. KAR

MANGO

- 2162 RAMANA (KVR), ARVINDA PRASAD (B), KRISHNAPRASAD (CA), PATWARDHAN (MV), DHANARAJ (S) and ANANTHA KRISHNA (SM). Temperature storage and the ripening behaviour of Alphonso. *Indian Food Packer.* 38(1); 1984; 58-66
- Low temperature storage and ripening behaviour of early and late harvest

(15 days after early harvest) Alphonso mangoes were studied. Total storage life of 28 days (22 days at 12.8 C, RH 90-95% and 6 days at RT (23-30 C), 45-65% RH) for early and 20 days (15 days at 12.8 C and 5 days at room temperature) for late harvests were obtained compared to 16 and 14 days in RT stored fruits respectively. The overall quality of low temperature stored fruits ranged between fair to good at the end of the storage period. Fruits held at RT for 9 to 11 days and then shifted to 12.8 C did not improve in shelf life and overall quality except for increased total carotenoids. Low temperature storage reduced the development of carotenoids even with final ripening at RT. Chilling injury was higher in fruits having higher soluble solids content at the time of storage at low temperature. Anthracnose and stem end rot caused greater spoilage in low temperature stored fruits. Data on ripening index, physiological loss in weight, sensory quality of the fruits and levels of soluble solids, acidity and carotenoids are presented. BSN

APRICOT

- 2163 COSTELL (E) and DURAN (L). Some rheological parameters as possible indices of the fruit content in jams. *Rev. Agroquím. Tecnol. Aliment.* 23(3); 1983; 427-32 (Spanish)

Fourteen apricot jam samples with varying pectin contents are analyzed. Fruit content ranged from 0 to 62.8%. Simple linear regression study of results indicated that fruit content explains a high proportion of the variability in four of the rheological parameters (K , n , T_0 , T_b) ($0.66 < r^2 < 0.82$). AA

APPLE

- 2164 VAN WOENSEL and De BAERDEMAEKER (J). Mechanical properties of apples during storage. *Food Sci. + Technol.* 16(6); 1983; 367-72

The change in textural parameters of Golden Delicious and Red Boskoop apples, harvested at various dates, was measured as a function of the storage time. An uniaxial compression test and a non-destructive dynamic resonance test were used. A stiffness coefficient was calculated from the apple mass and the resonance frequency of the spheroidal vibration mode. The value of this stiffness coefficient showed a sharp decline at the storage time when the fruit reached its maturity climacterium as determined by the activity of the malic enzyme. Hence, the stiffness coefficient seemed to be a useful parameter to determine the fruit acceptability to the consumer. AA

GUAVA

- 2165 KALRA (SK) and TANDON (DK). Guava nectars from sulphited pulp and their blends with mango nectar. *Indian Food Packer.* 38(1); 1984; 74-7

Eight nectar samples containing 15% pulp, 12 and 14% soluble solids and 0.20-0.35% acidity were prepared from sulphite preserved guava pulp. The nectars were fortified with 100 mg% vitamin C and stored for 10 months in glass bottles. Organoleptic evaluation indicated that the sample having 14% soluble solids and 0.25% acidity was the best, followed by 14% soluble solids and 0.20% acidity, and 12% soluble solids and 0.25% acidity. During storage of nectars, soluble solids and vitamin C decreased by 0.5-1.0% and 20-40%,

respectively, and titrable acidity increased by 0.02 to 0.04%. Nectar blends of guava and mango were inferior to guava or mango nectar. BSN

SUGAR, STARCH AND CONFECTIONERY

- 2166 MATHLOUTHI (M). Relationship between the structure and the properties of carbohydrates in aqueous solutions: Solute-solvent interactions and the sweetness of D-fructose, D-glucose and sucrose in solution. *Food Chem.* 13(1); 1984; 1-16
- 2167 HEYNS (K). Utilization of starch as an industrial raw material. *Getreide Mehl Brot.* 37(6); 1983; 163-8 (German)
 Starch - which is a renewable resource - should not be used just to produce substitutes for the products that are now obtained from petroleum, but rather, used as a source of new types of compounds with novel and better properties that may be put to many kinds of technological uses such as production of ascorbic acid, or paper and card board. KMD
- 2168 POVEY (MJW) and ROSENTHAL (AJ). Ultrasonic detection of the degradation of starch by α -amylase. *J. Food Technol.* 19(1); 1984; 115-9
 Reports an ultrasonic detection technique for degradation of starch using α -amylase, which enables monitoring starch hydrolysis. The technique is cheap, in-line, automatic, nondestructive, rapid and accurate. BSN
- 2169 HOSENEY (RC). Differential scanning calorimetry of starch. *J. Food Quality* 6(3); 1984; 169-82

BAKERY PRODUCTS

- 2170 ANON. 33rd Convention on Bakery Technology, 26-28 October 1982. *Dtsch. Lebensmittel-Rundschau.* 79(6); 1983; 191-4 (German)
 Summaries of the following 18 papers have been presented. SEIBEL (W), BRUMMER (J-M) and STEPHAN (H) - Experience with the milled cereal products of 1982. PAGENSTEDT (B) - Mechanization of the pre-dough stages of wheat flour. BRUMMER (J-M) and MORGENSTERN (G) - Influence of baking conditions on the crispness of bread rolls. STEPHAN (H) - Possibilities of influencing the structure of sliced rye bread having a predominant proportion of bran. POMERANZ (Y) - Protein-enriched breads in the U.S.A. HORST (M) and LANGGUTH (S) - Indication of additives in baked goods. ZEDDELMANN (Hv) - The new dietetic food ordinance and its consequences for the manufacturer of dietetic bread and dietetic fine baked goods. SEIBEL (W) - Alternative baked products - Production and sensory quality. FELCH (U) - Production of fresh, alkaline baked goods. WEISS (G) - Economics and operations analysis of fast food. HOFFMEYER (KH) - Problems with bread and small baked goods in fast foods. SEIBEL (W), BRUMMER (J-M), MORGENSTERN (G) and BRETSCHNEIDER (F). - Use of yellow linseed and pumpkin seeds in baked goods. DORR (R) - Concept of product lines in a manually operated bakery, and general possibilities of selection of product lines in the future. HUBER (H) - Pie-crusts in bakery operations - Production and quality requirements. SEIBEL (W) and BRETSCHNEIDER (F) - Flour quality and production of brown gingerbread. UNGERMANN (W) - Freezing of

dough, storage and thawing of cream- and cream-biscuits. BRACK (G), BRETSCHNEIDER (F), and LUDEWIG (HG) - Use of lactose in fine yeast-raised doughs. BRUMMER (J-M) and STEPHAN (H) - Bread and small baked goods assortment for fast foods. KMD

- 2171 ANON. Symposium: 'Bread and Fine Baked Goods in Fast Food'. *Getreide Mehl Brot.* 37(7); 1983; 209-21 (German)

The following 5 papers are printed in this issue: STELLER (W) and MUHLEIB (F) - Changes in gastronomy - Situation and trends (p 209-12). WEISS (G) - Operational analysis of fast foods (p 212-4). HOFFMEYER (KH) - Problems with bread and other baked products for fast food, and requests to producers (p 214-6). BRUMMER (JM) and STEPHAN (H) - Bread and roll varieties for fast food service (p 216-9). DORR (R) - Supply and demand for fast food products by handcraft bakeries, and varieties for the future (p 219-21). KMD

- 2172 BRUMMER (J-M) and MORGENSTERN (G). Influence of baking conditions on the crispness of rolls. *Getreide Mehl Brot.* 37(6); 1983; 175-8 (German)

It has been established that the crispness of rolls depends on the total moisture content and the loss of moisture during baking. Moisture losses during storage complete the picture. Crispness is lost due to a continuous increase in the moisture content, which is all the quicker as the duration of baking is shorter and hence the total moisture content of the roll is greater. Other environmental factors, such as the humidity of the air in the storage place also play a role. KMD

BREAD

- 2173 LINKO (P), MATTSON (C), LINKO (Y-Y) and ANTILA (J). Production of flat bread by continuous extrusion cooking from high α -amylase flours. *J. Cereal Sci.* 2(1); 1984; 43-51

Flat bread was prepared by direct continuous extrusion cooking from 1:1 mixtures of wheat and rye flour with low as well as high α -amylase activity. significant differences were noticed in chemical analysis and sensory evaluations. JVS

- 2174 TONOGAI (Y), KINGKATE (A), THANISSORN (W) and PUNTHANAPRATED (U). Gas chromatographic determination of propionic acid and sodium and calcium propionate in bread and cake. *J. Food Prot.* 46(4); 1983; 284-6

The simple, accurate method for determination of propionic acid and sodium and calcium propionate in breads and cakes enables simultaneous extraction with ethylacetate made acidic with phosphoric acid and injection into GC directly. The calibration curves ranged from 25-125 μ g/ml, with the detection limit of 25 ppm for the technique. The amounts of these three chemicals present in commercial biscuits, breads and cakes were below the limits prescribed by the Thailand regulations. BSN

- 2175 DUBOIS (D). What is fermentation? It is essential to bread quality. *Baker's Dig.* 58(1); 1984; 11-4

Various aspects of fermentation in bread making including its functions like gas production, effect on cell structure, gas retention and flavour, have been covered. KAR

- 2176 EL-BANNA (AA), LAU (P-Y) and SCOTT (PM). Fate of mycotoxins during processing of foodstuffs. II. Deoxynivalenol (vomitoxin) during making of Egyptian bread. *J. Food Prot.* 46(6); 1983; 484-6

Egyptian bread prepared using flour spiked with deoxynivalenol (DON) at a level of 2 µg/g in one batch and naturally contaminated flour (3.3 µg/g of DON) in other batches were analyzed by GC with electron capture detection and confirmed by GLC-MS single ion monitoring (SIM). The amount of DON in spiked flour or in flour naturally present was not affected either by fermented dough or by baking process (350 C for 2 minutes). BSN

- 2177 EL-BANNA (AA) and SCOTT (PM). Fate of mycotoxins during processing of foodstuffs. 1. Aflatoxin B₁ during making of Egyptian bread. *J. Food Prot.* 46(4); 1983; 301-4

By using reversed phase HPLC, Egyptian bread prepared from wheat flour spiked with aflatoxin B₁ (0.1 µg/g) was examined for formation of aflatoxin B_{2a}. During preparation of fermented dough, about 19% of added toxin was destroyed, whereas on baking (350 C, 2 minutes), the reduction was by an additional 36% to give a bread with retention still of 45% of toxin, which certainly carries a risk for the consumers. BSN

- 2178 CHANDRASHEKARA (S) and SHURPALEKAR (SR). Optimum formulations and processing conditions for wheat-tuber breads. *Food Sci. + Technol.* 16(6); 1983; 332-7

As compared to farinograph water absorption of the flour blends (20% cassava or 15% potato flour or suitably modified formulation) at 500 B.U., 6% more or 4% less water was required for obtaining a dough of desired consistency in case of cassava or potato respectively. The loaf volume and crust and crumb characteristics of wheat-tuber breads could be improved considerably by decreasing (i) yeast level from 2.0 to 1.0% in case of cassava and 1.5% in case of potato, (ii) potassium bromate level from 15 to 5 ppm and (iii) fermentation time from 165 to 60 minutes and including 0.5% diastatic cereal malt. Based on the optimum formulation and processing conditions, the loaf volumes of wheat-tuber breads (570-580 cc) compared favourably with that of control wheat bread (610 cc). AA

- 2179 LINKO (P), HARKONEN (H) and LINKO (Y-Y). Effects of sodium chloride in the processing of bread baked from wheat, rye and barley flours. *J. Cereal Sci.* 2(1); 1984; 53-62

The differences in physical characteristics of dough and bread caused by varying salt levels have been discussed. In organoleptic terms, best bread from wheat was obtained by adding salt at 1% level (flour weight basis), and from wheat/rye or rye by adding 1.5% salt. JVS

- 2180 VASSILEVA (R), MENDER (A) and SEIBEL (W). Thiamine and riboflavin losses during baking of wheat (flour) bread. *Getreide Mehl Brot.* 37(7); 1983; 206-9 (German)

The losses of thiamine and riboflavin during the baking of bread from wheat flours of the types T 1150, T 700, and T 500 (having ash contents of 1.15, 0.70, and 0.50% dry weight basis, respectively) have been measured. Thiamine losses ranged from 0.069 to 0.392 mg%, and riboflavin losses from 0.065 to 0.125 mg%. Thiamine loss decreased with the ash content of the flour 50% in bread from T 1150 flour, 35% in bread from T 700 flour, and 17% in bread from T 500 flour. Extension of baking time by 10 minutes had no effect

on thiamine loss, but the pattern of temperature variation in the baking oven did have an influence. Losses of riboflavin during baking amount to 6-14%.
KMD

- 2181 STEPHAN (H). Possibilities of influencing the structure of sliced rye bread with very high amounts of rye meal. *Getreide Mehl Brot.* 37(6); 1983; 178-80 (German)

In recent years, consumers have acquired a preference for rye bread having the following qualities: (i) a slice of comparatively large size; (ii) visible grains of rye or coarse rye particles that can be noticed while chewing; (iii) softness like that of bread made from rye flour alone; (iv) less acidic in taste; (v) very good fresh-keeping quality; and (vi) characteristics that a consumer expects from a whole rye bread. Attempts to make such a bread, using dough preparation machine, and different proportions of rye meal admixed with rye flour, have been described. Some guidelines have been laid down for bakers who wish to make a bread of this type. KMD

- 2182 BALLESTER (D), ZACARIAS (I), GARCIA (E) and YANEZ (E). Baking studies and nutritional value of bread supplemented with full-fat sweet lupine flour. (*L. albus* cv. Multolupa). *J. Food Sci.* 49(1); 1984; 14-6,27

Effects of enriching bread with increased levels of full fat sweet lupine flour (FFLF) on the physical properties of the dough and biological quality of protein were investigated. Results suggests that FFLF not only increased the protein content, but also a protein with a better amino acid balance. The physical properties like the loaf volume, crust colour and texture were not significantly affected. MVG

GINGERBREAD

- 2183 SEIBEL (W) and BRETSCHNEIDER (F). Flour quality and production of brown gingerbread. *Getreide Mehl Brot.* 37(6); 1983; 181-4 (German)

In order to save time, gingerbread was made from cold-prepared base doughs, without any storage of dough. If a suitable flour was used (protein content 10-11%, falling index $\pm$ 250 s) gingerbreads of comparatively good quality can be prepared in this way. A further possibility of rationalization is offered by the use of high output kneading machines; but such a change in the processing method needs to be investigated further. KMD

CRUMPET

- 2184 SMITH (JP), JACKSON (ED) and OORAIKUL (B). Microbiological studies on gas-packaged crumpets. *J. Food Prot.* 46(4); 1983; 279-83, 286

English-style crumpets, a chemically leavened bakery product, had a shelf-life of 14 days when packaged in a CO₂:N₂ (3:2) gas atmosphere and stored at ambient temperature. Packages were visibly swollen after 14 days due to additional CO₂ production, and the product had a distinct fruity odour when opened. Initial microbiota of the product, isolated from anaerobic plates, consisted entirely of facultative anaerobic spore-forming strain of *Bacillus licheniformis*. After 7 days at 25 C, the spoilage pattern changed, with lactic acid bacteria (LAB) accounting for almost 100% of the total anaerobic plate counts (TPC) on APT and MRS (pH 5.5) agar media. Subsequently, the number of LAB declined slightly in relation to the TPC, and *B. licheniformis* strains reappeared. As the LAB increased in numbers, there was a

concomittant increase in CO₂ and lactic acid production and a drop in pH of the product. Metabolic activity continued even after the LAB were in the maximum stationary phase. *Leuconostoc mesenteroides* was subsequently identified as the major-CO₂-producing isolate. AA

MILK AND DAIRY PRODUCTS

- 2185 McMURDO (TH) and WHYARD (S). Suitability of rapid microbiological methods for the hygienic management of spray drier plant. *J. Soc. Dairy Technol.* 37(1); 1984; 4-9
The advantages of using a rapid method and the criteria and methods used to evaluate commercially available instruments are tested. The Malthus system appears to represent the best rapid microbiological tool available. KAR
- 2186 HILL (BM). The thermo-stable nuclease test as a method for identifying *Staphylococcus aureus*. *Aust. J. Dairy Technol.* 38(3); 1983; 95-6
All the 139 *S. aureus* strains were found to be thermo-stable nuclease (TSN) producers. The TSN test was confirmed as a useful method for the rapid identification of *S. aureus* either for confirming negative coagulase results or in place of the coagulase test itself. KAR
- 2187 HICKEY (MW), HILLIER (AJ) and JAGO (GR). Enzymic activities associated with lactobacilli in dairy products. *Aust. J. Dairy Technol.* 34(4); 1983; 154-7
Strains of *L. acidophilus*, *L. bulgaricus*, *L. casei*, *L. helveticus*, *L. helveticus* subsp. *jugarti*, *L. lactis* and *L. plantarum* possessed the enzyme threonine aldolase which cleaves threonine to glycine and acetaldehyde. None of the lactobacilli tested possessed urease activity and only *L. casei* was able to decarboxylate α -ketoisocaproic or α -ketoisovaleric acids. *L. helveticus* and *L. helveticus* subsp. *jugarti* which does not contain a pyruvate oxidase, was shown to possess an NADH-oxidase for the removal of molecular oxygen. AA
- 2188 KIESEKER (FG). Recombined dairy products. *Food Technol. Aust.* 36(1); 1984; 34-6, 38
All aspects of recombining including the raw materials, additives, recombining procedure, and reconstitution have been covered in this article. KAR
- 2189 VAN EGMOND (HP). Mycotoxins in dairy products. *Food Chem.* 11(4); 1983; 289-307
Aspects covered in this review include aflatoxin M₁ and its presence in dairy products, method of analysis, effects of processing on aflatoxin M₁ methods of elimination of aflatoxin, and other mycotoxins in dairy products. KAR

MILK

- 2190 TAYAL (M) and SINDHU (JS). Heat stability and salt balance of buffalo milk as affected by concentration and addition of casein. *J. Food Process. Preserv.* 7(3); 1983; 151-60

- 2191 FRIEND (BA), SHAHANI (KM), LONG (CA) and AGEL (EN). Evaluation of freeze-drying, pasteurization, high-temperature heating and storage on selected enzyme, B vitamins and lipids of mature human milk. *J. Food Prot.* 46(4); 1983; 330-34

Freeze-drying of human milk significantly decreased ($P < 0.05$) the lactoperoxidase and lysozyme, but did not affect lipase or protease. Storage after freeze drying, however, destroyed lactoperoxidase activity, but did not affect other enzymes. Significant decrease ($P < 0.05$) in lactoperoxidase lipase and protease was observed on heating milk at 62.5 C for 30 minutes or 75 C for 15 minutes. Inactivation of lysozyme occurred significantly only by heating at 75 C. Freeze-drying, heating and/or storage did not affect the stability of biotin, niacin and pantothenic acid; similar was also the case with lipid components. BSN

- 2192 NELSON (KH) and CATHCART (WM). Analytical technique for measuring transmission of light through milk carton materials. *J. Food Prot.* 46(4); 1983; 309-14

- 2193 KWEE (WS). Phosphatase reactivation in cream samples. *Aust. J. Dairy Technol.* 34(4); 1983; 160-62

A case study is presented on the effect of exposure to elevated temperatures of pasteurized cream samples which contains reactivatable alkaline phosphatase. Pre-warming of samples to 45 C for 10 minutes prior to the phosphatase test, as stated in Australian Standard Method 1095.22-1973, produced false positive results. A test for the differentiation of residual and reactivated phosphatase was applied successfully. However, further evaluation revealed that the test could produce false negative results when testing cream samples which contained both reactivatable phosphatase and low levels or raw cream or raw milk. AA

- 2194 PAN (SHL), DILL (CW), ALFORD (ES), RICHTER (RL) and GARZA (C). Heat inactivation of bile salt-stimulated lipase activity in human milk and colostrum. *J. Food Prot.* 46(6); 1983; 525-7

- 2195 SEN (NP), SEAMAN (S) and KARPINSKY (K). Determination of N-nitrosodimethylamine in nonfat dry milk. Collaborative study. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 232-6

NDMA is eluted from a mixture of celite acidic sulphamic acid and nonfat dry milk (packed in a column) by using sulphamic acid; it is then concentrated and analysed by GC-thermal energy analyser. JVS

- 2196 BROSIO (E), ALTOBELLI (G) and DI NOLA (A). A pulsed low-resolution NMR study of water binding to milk proteins. *J. Food Technol.* 19(1); 1984; 103-8

Water binding to casein, albumin and γ -globulin as studied by pulsed low resolution NMR revealed that nonexponentiality of the spin echo decay curves of water may be exploited to determine the water mobility as well as the abundance of bound and free water in samples added with progressive amounts of water to 1 g of dry protein. BSN

- 2197 GRUNEWALD (KK) and MITCHELL (LK). Growth of mice fed milk fermented with *Lactobacillus acidophilus*. *J. Food Prot.* 46(4); 1983; 315-7

- 2198 WISEMAN (DW), APPLEBAUM (RS), BRACKETT (RE) and MARTH (EH). Distribution and resistance to pasteurization of aflatoxin M₁ in naturally contaminated whole milk, cream and skim milk. *J. Food Prot.* 46(6); 1983; 530-32

Milk, naturally contaminated with aflatoxin M₁ (AFM₁), was separated with a hand-operated separator. Distribution of AFM₁ paralleled the partitioning of whole milk into cream and skim milk. Most of the whole milk was recovered as skim milk, which also contained most of the AFM₁. Cream accounted for 5-15% of the amount of whole milk and had 2-14% of AFM₁ that originally occurred in whole milk. Cream and skim milk were pasteurized at 64 C for 30 minutes. AFM₁ was stable in both products given heat treatment. AA

- 2199 OEHLRICH (HK) and McKELLAR (RC). Evaluation of an 18 C/45-hour plate count technique for the enumeration of psychrotrophic bacteria in raw and pasteurized milk. *J. Food Prot.* 46(6); 1983; 528-9

- 2200 SINGH (J). Inhibition of growth of spoilage microorganisms by *Streptococcus thermophilus* and *Lactobacillus acidophilus* in cow, buffalo and goat milk. *J. Food Prot.* 46(6); 1983; 497-8

Antibacterial activity of *Streptococcus thermophilus* culture filtrate was observed against *E. coli*, *Pseudomonas fragii*, *Micrococcus flavus* and *Staphylococcus aureus* in milk irrespective of the source (cow, buffalo, goat) and period of incubation. Filtrates of *Lactobacillus acidophilus* and mixed cultures of *S. thermophilus* and *L. acidophilus* exhibited significant antibacterial activity against test microorganisms. Buffalo milk showed more inhibitory activity of lactic cultures than cow milk. BSN

- 2201 MOUSTAFA (MK), AHMED (AA-H) and MARTH (EH). Occurrence of *Versinia enterocolitica* in raw and pasteurized milk. *J. Food Prot.* 46(4); 1983; 276-8

Raw milk (100 samples) and pasteurized milk (100 samples) were assayed for presence of *Versinia enterocolitica*, using four different enrichment and post-enrichment technique. Isolation of *V. enterocolitica* was made on MacConkey agar and Cefsulodin-Irgasan-Novobiocin (CIN) agar directly from incubated broths containing the milk, and after treatment of enrichment broths with a potassium hydroxide solution. Twelve samples of raw milk and one of pasteurized milk contained *V. enterocolitica*. Nearly all isolates were found after KOH treatment. All isolates except that obtained from the pasteurized milk sample produced detectable levels of heat-stable enterotoxin. However, none of the 13 isolate agglutinated in WA-SAA, an antiserum specific for virulent *V. enterocolitica*. AA

- 2202 HICKEY (MW), ROGINSKI (H) and BROOME (MC). Growth and acid production of group N streptococci in ultrafiltered milk. *Aust. J. Dairy Technol.* 38(4); 1983; 138-43

The growth and acid production of *Streptococcus cremoris* BK5, in the presence and absence of pH control, increased directly with the concentration of ultrafiltered milk (retentate). A range of *S. cremoris* and *S. lactis* starter organisms also produced more lactic acid in retentates than in milk. The general composition of milk retentates is given and the buffering capacities of these retentates is quantified. The results suggest that retentate is an improved growth medium for starter organisms. AA

- 2203 SHEKAR (S) and BHAT (GS). Influence of dissolved oxygen on acid production in buffalo milk by lactic cultures. *J. Food Prot.* 46(4); 1983; 321-4

YOGHURT

- 2204 PATEL (AM), DAVE (JM) and SANNABHADTI (SS). Acid production by yoghurt starters and their effect on proteolysis and lactose utilization in buffalo skim milk. *J. Food Sci. Technol. (India)* 20(6); 1983; 317-9

Buffalo skim milk was inoculated with *Streptococcus thermophilus* and *Lactobacillus bulgaricus* to produce yoghurt and the rate of acid production, cell number increase, lactose utilization and proteolysis were investigated in samples incubated at 40 and 45 C. Among the two cultures at both the temperatures, *S. thermophilus* showed faster rate of growth and acid production till 6 hours of growth after which *L. bulgaricus* gave higher values. Growth was faster when mixed cultures were used. Lactose utilization was maximum by *S. thermophilus*, and the mixed cultures within 4 hours while in *L. bulgaricus* utilization was faster after 4 hours. Soluble protein content was markedly lower in all samples after the growth of lactic cultures. Maximum activity was observed at 45 C and with the mixed cultures. It was concluded that buffalo milk is suitable for the preparation of yoghurt within 3 hours at 45 C using minoculum at 5% level. KAR

WHEY

- 2205 ZADOW (JG). Whey utilization. *CSIRO Food Res. Q.* 43(1); 1983; 12-21
Aspects covered include: unit processes including reverse osmosis and ultrafiltration; demineralization, lactose hydrolysis, lactose crystallization, fermentation processes, other processes like chemical modification, protein separation techniques, and drying, and composition and analysis of whey based products, end-product utilization; animal feed and human food. KAR
- 2206 BARLOW (IE), HARDHAM (JF) and ZADOW (JG). Stability of reconstituted whey protein concentrates to ultra-heat-treatment processing. *J. Food Sci.* 49(1); 1984; 32-3,39

CHEESE

- 2207 EL-GENDY (SM), ABDEL GALIL (HA), SHAHIN (Y) and HEGAZI (FZ). Use of salt-tolerant lactic acid bacteria for manufacture of white pickled cheese (*Domiat*) ripened without salted whey in sealed polyethylene pouches. *J. Food Prot.* 46(4); 1983; 335-8
- 2208 GAYA (P), MEDINA (M) and NUNEZ (M). Accelerated decrease of *Enterobacteriaceae* counts during ripening of raw milk Manchego cheese by lactic culture inoculation. *J. Food Prot.* 46(4); 1983; 305-8, 314
- 2209 MOUSTAFA (MK), AHMED (AA-H) and MARTH (EH). Behaviour of virulent *Yersinia enterocolitica* during manufacture and storage of colby-like cheese. *J. Food Prot.* 46(4); 1983; 318-20

Colby-like cheese, prepared from pasteurized whole milk artificially contaminated with two virulent strains of *Yersinia enterocolitica* (separately) and enumerated by surface plating, on cefsulodin-irgasan-Novobiocin (CIN) agar, showed 1000-fold increase (about 1×10^6 /g of curd) during manufacturing process. Over a period of weeks, a reduction in numbers of *Y. enterocolitica* was observed. Even after seven weeks at 3 ± 1 C one strain

could not be detected in cheese. Other strains, however, continued in numbers in excess of 200/g after 8 weeks at the same temperature. BSN

- 2210 DE GIORI (GS), De VALDEZ (GF), De RUIZ HOLGADO (APU) and OLIVER (G). Microflora of Tafi cheese: Changes during manufacture and maturation. *J. Food Prot.* 46(6); 1983; 518-21

Predominant microflora present in Tafi cheese were mesophilic streptococci, leuconostocs and homofermentative lactobacilli. On the surface, *Streptococcus lactis* and internally on the cheese after pressing were predominant. During maturation, *Lactobacillus casei* and *Lactobacillus plantarum* were found in large numbers. No pathogenic organisms were present in all the samples analysed. BSN

- 2211 JUAREZ (M) and MARTIN-HERNANDEZ (MC). Content of mineral elements in cheeses from the Spanish market determined by atomic absorption spectrophotometry. *Rev. Agroquim. Tecnol. Aliment.* 23(3); 1983; 417-26 (Spanish)

The contents of several mineral elements in 14 types of cheeses from the Spanish market were determined. A colorimetric method was applied for P determination. The other elements were determined by atomic absorption spectrophotometry. The ranges found for the different elements were as follows: Na, 0.20-2.44%; K, 0.050-0.240 %; Ca, 0.31-1.02%; Mg, 0.014-0.050%; P, 0.32-0.63%; Fe, 1.35-7.48 mg/Kg; Cu, 0.29-2.24 mg/Kg; Zn, 19.80-35.52 mg/Kg; Mn and 0.11-0.55 mg/Kg. AA

KHOA

- 2212 GUHA (AK), DAS (HN), ROY (R) and ROY (BR). Antibiotic resistant coliforms in Khoa. *J. Food Sci. Technol. (India)* 20(6); 1983; 315-6

187 Khoa samples collected from vendors in Calcutta (India) for over 3 years were tested for *E. coli*, *Klebsiella*, *Enterobacter* and *Citrobacter*. Organisms were also tested for resistance against penicillin, ampicillin, streptomycin, erythromycin, chloramphenicol and tetracycline. The percentage of organisms showing resistance to each antibiotic is tabulated. 10 different serotypes of *E. coli* were isolated, of which 91.7% were resistant to one or the other antibiotics. Most of the coliforms were resistant to penicillin and erythromycin, but were sensitive to streptomycin and chloramphenicol. KAR

MEAT AND POULTRY

MEAT

- 2213 WHITE (GW) and SHENTON (AJ). Food microscopy (An annotated bibliography). Part III H. Meat and Fish. *J. Assoc. Public. Anal.* 21 (Part I), 1983, 29-33

An annotated bibliography on the various aspects of the meat and fish covering 100 references from 1969 to 1982 has been presented. BSN

- 2214 JOHNSON (BY). New developments in the Australian meat industry. *CSIRO Food Res. Q.* 43(1); 1983; 1-8

- 2215 SEIDEMAN (SC) and DURLAND (PR). The utilization of modified gas atmosphere packaging for fresh meat: A review. *J. Food Quality*. 6(3); 1984; 239-52
Various aspects covered include the importance of meat colour, importance of microbial growth including the role of oxygen, carbon dioxide, nitrogen and gas mixture. KAR
- 2216 RENERRE (M). Effect of electrical stimulation on meat colour. *Sci. Aliment*. 3(3); 1983; 371-80 (French)
Six sides of charolais cows were electrically stimulated 30 minutes *post mortem*, the six other sides were used as controls. Subjective assessment of the colour, reflectance measurements and oxygen uptake were done on *M. Tensor fasciae latae* and *M. Triceps brachii caput longum*. At 24 hours *post mortem*, electrical stimulation brings about a brighter lean meat colour. No difference in total pigment is noted otherwise. For both aged muscles (8 days, + 5 C), electrical stimulation is associated with a reduction of metmyoglobin percentage. No differences in oxygen uptake of muscle homogenates are induced by electrical treatment. AA
- 2217 SEIDEMAN (SC), CROSS (HR), SMITH (GC) and DURLAND (PR). Factors associated with fresh meat colour: A review. *J. Food Quality*. 6(3); 1984; 211-37
This review discusses various colour forms of myoglobin in muscle and their relationship to species, atmospheric conditions, antemortem factors and storage characteristics. KAR
- 2218 ZUBILLAGA (MP) and MAERKER (G). Modified dry column procedure for extraction of lipids from cured meats. *J. Food Sci.* 49(1); 1984; 107-9
A modified dry-column procedure to avoid interference of pigmented contaminants has been reported for polar lipids from nitrite-treated meats. Three modification included compositional change in the trap (i), insertion of additional material between column proper and trap (ii) and changes in solvent system (iii). (i) gave the best results by the addition of magnesium oxide. MVG
- 2219 PEREZ (MGR) and CALVELO (A). Modeling the thermal conductivity of cooked meat. *J. Food Sci.* 49(1); 1984; 152-6
There was good correlation between thermal conductivity and water content, the values for which were independent of cooking temperatures. A mathematical model was also proposed for thermal conductivity of cooked meat. MVG
- 2220 SEIDEMAN (SC) and DURLAND (PR). Restructured red meat products: A review. *J. Food Quality*. 6(2); 1984; 81-101
- 2221 BOURGEOIS (CM), ABGRALL (B) and CHAVE (E). Growth of selected lactobacilli inoculated in meat products. *Sci. Aliment*. 3(3); 1983; 381-95 (French)
The objective of this work was to determine whether lactobacilli are capable of growing in sausages cooked for a brief period and then stored at 4 C, and of exerting a favourable effect in the sausages. It was found that the lactobacilli do multiply rapidly when inoculated into a sausage, and lower the pH by about 0.2-0.5 units, but that they do not inhibit other contaminating organisms. KMD
- 2222 GIRARD (JP) and CALDERON (F). Minced meat products: Meat emulsions and fine pastes. *Rev. Agroquim. Tecnol. Aliment*. 23(3); 1983; 291-302 (Spanish)
This review covers: A - the technology of preparation of fine meat pastes; and B - the physico-chemical characteristics of fine pastes and their

relation to the quality and yield. The aspects covered under A are: (1) equipment and operations of mincing and mixing; (2) blending and pre-blending; (3) canning; and (4) heat treatment: dry cooking. The aspects covered under B are: (i) manufacturing yield; (ii) variation of the paste temperature during mincing; (iii) density of the paste; (iv) colour of the paste; (v) viscosity of the paste and consistency of the end-product; and (vi) structure of the fine pastes. KMD

BEEF

- 2223 FABIANSSON (S), ERICHSEN (I), REUTERSWARD (AL) and MALMFORS (G). The incidence of dark cutting beef in Sweden. *Meat Sci.* 10(1); 1984; 21-33
- 2224 CROUSE (JD) and SEIDEMAN (SC). Effect of high temperature conditioning of beef from grass or grain fed cattle. *J. Food Sci.* 49(1); 1984; 157-60
- 2225 DRANSFIELD (E), NUTE (GR), ROBERTS (TA), BOCCARD (R), TOURAILLE (C), BUCHTER (L), CASTEELS (M), COSENTINO (E), HOOD (DE), JOSEPH (RL), SCHON (I), and PAAR EKOOPER (EJC). Beef quality assessed at European Research Centres. *Meat Sci.* 10(1); 1984; 1-20
- 2226 DAVEY (KR). An instrument for the measurement of the hardness of fat on sides of chilled beef. *J. Texture Stud.* 14(4); 1983; 419 - 30
 An instrument has been developed to measure the hardness of fat on sides of chilled beef. A 0.97 mm diameter cutting pin, 3.76 mm long, is inserted perpendicular to the subcutaneous fat and moved through the fat a fixed distance in a direction parallel to its surface by a pretensioned spring. The time for the pin to travel this distance is measured electronically. Times are recorded for the pin to travel through both air and fat and the average force to cut through the fat is then calculated from these readings. There was a linear relationship between the average force resisting the pin travel and the subjective ratings of fat hardness by five experienced boning room personnel. The instrument offers a simple, rapid and portable method of measuring fat hardness in abattoirs. AA
- 2227 MARCHELLO (JL), MILNE (DB) and SLANGER (WD). Selected macro and micro minerals in ground beef and longissimus muscle. *J. Food Sci.* 49(1); 1984; 105-6
- 2228 HAPPICH (ML), ACKERMAN (S), MILLER (AJ), SWIFT (CE) and GUMBMANN (MR). Composition and protein efficiency ratio of meat samples partially defatted with petroleum ether, acetone, or ethyl ether. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 265-70
 Partially defatted as well as unextracted beef showed small variation between the proteins and nitrogenous components. The PER of extracted meat was, however not affected. JVS
- 2229 FOEGEDING (EA), NAUMANN (HD) and STRINGER (WC). Effect of aerobic storage before vacuum packaging on the pH, colour and bacterial flora of beef. *J. Food Prot.* 46(4); 1983; 287-91
- 2230 NASSOS (PS), KING (AD) Jr. and STAFFORD (AE). Relationship between lactic acid concentration and bacterial spoilage in ground beef. *Appl. Environ. Microbiol.* 46(4); 1983; 894-900

- 2231 HUFFMAN (DL), McCAFFERTY (DM), CORDRAY (JC) and STANLEY (MH). Restructured beef steaks from hot-boned and cold-boned carcasses. *J. Food Sci.* 49(1); 1984; 164-7
- 2232 NAKAMURA (R), HAYAKAWA (S), YASUDA (K) and SATO (Y). Emulsifying properties of bovine blood globin: A comparison with some proteins and their improvement. *J. Food Sci.* 49(1); 1984; 102-4, 113
- 2233 WARRISS (PD), KESTIN (SC), BROWN (SN) and WILKINS (LJ). The time required for recovery from mixing stress in young bulls and the prevention of dark cutting beef. *Meat Sci.* 10(1); 1984; 53-68
- 2234 DEVINE (CE), ELLERY (S), and AVERILL (S). Responses of different types of ox muscle to electrical stimulation. *Meat Sci.* 10(1); 1984; 35-51
- 2235 KESHAVA RAO (V) and NARAYANA RAO (PL). A comparative study of certain physical and chemical properties of carcass fat of buffaloes (*Bos bubalis*) and Zebu cattle (*Bos indicus*). *Indian J. Anim. Res.* 17(2); 1983; 103-107
- Iodine value (IV), saponification value (SV) and refractive index (RI) of twenty bull calves each of buffaloes and zebu cattle were studied. IV of cattle fat was significantly higher than that in buffaloes, while external fat was significantly higher than buffaloes. External fat had significantly higher iodine number (32.7) than internal fat (26.55). Significant differences ($P < 0.05$) in IV were also found between different groups of buffaloes and cattle. The SV of the fats from both animals did not differ suggesting similar levels of short chain fatty acids. There were, however, differences in SV between different weight groups of animals and anatomical location of fat. The RI of buffalo fat was lower than that of zebu cattle, the RI of external fat being more than that of internal fat. There were no differences in RI between the different groups of animals. MVG
- 2236 VALIN (C), PINKAS (A), DRAGNEV (H), BOIKOVSKI (S) and POLIKRONOV (D). Comparative study of buffalo meat and beef. *Meat Sci.* 10(1); 1984; 69-84

MUTTON

- 2237 HUDSON (JE) and LOXLEY (RA). The effect of pentose sugars on the aroma and flavour of mutton. *Food Technol. Aust.* 35(4); 1983; 174-175
- 2238 VIJAYA RAO (D), BHAGIRATHI (B) and SHARMA (TR). Fluctuations in the quantitative predominance of bacterial groups in fresh and stored mutton. *J. Food Sci. Technol. (India)* 20(6); 1983; 277-81
- Meat samples collected from the butchers were excised and stored at (i) $25 \pm 2^\circ\text{C}$, (ii) $5 \pm 2^\circ\text{C}$ and at (iii) -20°C and were examined at different time intervals for the microbial load. The aerobic bacterial flora of fresh mutton was largely made up of lipolytic or proteolytic psychrotrophs which increased 2-3 fold in (i). In (ii), psychrotrophs increased rapidly and the proteolytic groups increased initially, while in the later stages lipolytic bacteria were predominant. In (iii), there was gradual decrease in all the types over a period of 3 months. Predominant aerobic bacteria were *Staphylococcus*, *Micrococcus*, *Bacillus*, three genera of *Coryneforms*, *Enterobacter*, *Acinetobacter*, *Pseudomonas* and *Moraxella*. *Staphylococci* were the dominant lipolytic bacteria followed by *Micrococcus*, where equal number of bacteria

from both genera were proteolytic. In exposed mutton, stored in (i) and (ii) gram positive bacteria predominated, whereas in covered meat, gram negative were predominant. Moisture loss increased with the storage period. Meat developed off-odour when the total plate count was $> 10^7$ -8/gram, but the colour change was independent of total plate count. The spoilage was perceptible when total count was 10^7 /g. The spoilage flora comprised of *Pseudomonas*, *Acinetobacter*, *Enterobacteriaceae*, *Staphylococcus*, *Micrococcus* and Gram positive bacilli. KAR

GOAT

- 2239 RAKESH KUMAR, AMRESH KUMAR AND HARPAL SINGH. Effect of partial (Baiburtcjan's) method of castration on quality of meat in goats. *Indian J. Anim. Res.* 17(1); 1983; 45-59

Goats of Barbari variety were castrated by Baiburtcjan's method at 15 days, 1, 2, and 3 months of age and studied for organoleptic and physico-chemical characteristics in comparison with entire animals. The ranking from good to poor of attributes of aroma, flavour, juiciness and tenderness were in the order of 1 and 2 months castrates, followed by entires, 15 days and 3 months castrates. Muscles of the entires were the most coarse and the coarseness was minimum in 1 month castrates and intermediate in other castrates. No significant differences were observed in myoglobin, oxymyoglobin, metmyoglobin contents, pH value, moisture, ash, protein and fat percentage of various muscles between entires and partially castrated goats. MVG

SHEEP

- 2240 WINGER (RJ). Selection of judges and assessment of storage-related flavour in frozen sheep meats. *J. Food Technol.* 19(1); 1984; 17-20

A taste panel, initially consisting of 125 people, from which 34 panelists were finally selected examined flavour changes in frozen sheep meat. On the basis of the data obtained, a suitable scoring system has been developed. BSN

STEER

- 2241 CROSS (HR), SORINMADE (SO) and ONO (K). Effect of electrical stimulation on carcasses from stressed and unstressed steers. *J. Food Quality.* 6(2); 1983; 73-9

Attempt has been made to evaluate the combined effects of antemortem stress and postmortem electrical stimulation on properties of the beef longissimus from steers. KAR

- 2242 NUTE (GR) and DRANSFIELD (E). The quality of sirloin from zeranol implanted steers. *J. Food Technol.* 19(1); 1984; 21-8

PORK

- 2243 MYERS (BR), EDMONDSON (JE), ANDERSON (ME) and MARSHALL (RT). Potassium sorbate and recovery of pectinolytic psychrotrophs from vacuum-packaged pork. *J. Food Prot.* 46(6); 1983; 499-502, 505

- 44 GIBSON (AM), ROBERTS (TA) and ROBINSON (A). Factors controlling the growth of *Clostridium botulinum* types A and B in pasteurized curd meats VI. Nitrite monitoring during storage of pasteurized pork slurries. *J. Food Technol.* 19(1); 1984; 29-44
- 45 MAHENDRA PRASAD, CHANDIRAMANI (NK) and USHA MANDOKHOT. Studies on the hygienic quality of pork products sold in the Indian market. *J. Food Sci. Technol.* (India) 20(6); 1983; 273-6

Ready-to-cook samples of bacon, and ham and ready-to-eat samples of sausages collected from retail shops in New Delhi (India) were analysed for (i) coliforms, (ii) Streptococci, (iii) *E. coli* and (iv) *C. perfringens*. About 40% of the samples of each product contained 10^7 - 10^8 /g of psychrophiles. Nearly 84% of the samples had 10^5 - 10^8 /g of mesophiles. The standard plate count of about 90% of the samples was $>10^5$ /g. Coliforms and *E. coli* were absent in bacon, but faecal Streptococci varied between 10^3 and 10^6 /g. In ham, coliforms and *E. coli* were found in a few samples depending upon the source, but faecal Streptococci were present in the range of 5.1×10^4 to 5.1×10^6 /g. In sausages, the coliform count ranged from 8.9×10^2 to 4×10^3 /g. *E. coli* was present in some samples depending upon the source of collection. Faecal Streptococci were isolated from all the commercial samples of sausages. Enterotoxin producing *S. aureus* was isolated in large numbers from ready-to-eat pork products. Salmonellae were also isolated from a sample of ham and sausage. KAR

HAM

- 246 KEETON (JT). Effects of potassium chloride on properties of country-style hams. *J. Food Sci.* 49(1); 1984; 146-8
- 247 FLORES (J), BERMELL (S) and NIETO (P). Salinity and ripening: Possibles in dex of quality for dry cured hams. *Rev. Agroquim. Tecnol. Aliment.* 23(3); 1983; 433-8 (Spanish)

The possibilities of salinity index 100% salt/(% protein +% fat), and ripening index 100.% non protein nitrogen/% soluble protein, proposed in this paper as quality parameters for dry curing hams, were studied. Dry cured hams subjected to slow process, in natural dryers, and to rapid process, in artificial dryers, are tested. The results obtained show that, with similar salinity index (18) in the hams, the slow dry cured ones have higher ripening index (74), than the rapid dry cured (61 hams). However, the slow dry cured hams with higher salinity index (22) only get 57 as ripening index. AA

BACON

- 2248 GATES (RA), PENSABENE (JW) and FIDDLER (W). Comparison of three methods for determination of N-nitrosopyrrolidine (NPYR) in fried dry-cured bacon. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 236-9

A dry column chromatographic method for NPYR was tested for applicability to dry cured bacon. It was found to be rugged and quicker than mineral oil distillation (MOD) procedure. There were no significant differences in the NPYR values obtained by this method and multidetection thermal energy analyser. Significant differences were noticed in NPYR values by this method and MOD procedure. JVS

POULTRY

- 2249 SINGH (AG) and BHULLAR (AS). Poultry development under five year plans in India. *Poult. Guide.* 21(1); 1984; 33-8
- 2250 KUMAR (S) and PEDERSEN (WJ). Methods of improving mechanically deboned poultry meat quality - a review. *Avian Res.* 67(3); 1983; 108-15
 Mechanically deboned poultry meat (MDPM) suffers from unstable colour and flavour, lack of texture, and poor microbial quality. Attempts have been made to improve shelf-life and microbial quality of MDPM by adjustment of pH and preblending of salts, pasteurization; addition of anti-oxidants and polyphosphates; centrifugation; blending with hard-deboned meat and textured vegetable proteins; and shaping by extrusion and texturization. The last-named process appears to be the one best suited to make this product more versatile. KMD
- 2251 SHARMA (BD), SHARMA (N) and PADDA (GS). Packaging of poultry meat. *Poult. Guide.* 21(5); 1984; 41-42
- 2252 GRAY (RJH), ELLIOTT (PH) and TOMLINS (RI). Control of two major pathogens on fresh poultry using a combination potassium sorbate/carbon dioxide packaging treatment. *J. Food Sci.* 49(1); 1984; 142-5, 179
 Effectiveness of a combination of potassium sorbate and modified atmosphere packaging treatment in inhibiting *Salmonella enteridis* and *Staphylococcus aureus* in fresh chicken thighs stored at 10 C, (simulating poor control condition) was studied. Results showed low CO₂ concentration alone was insufficient, but addition of sorbate even at lowest concentrations created inhibitory environment which was improved by high concentration of CO₂. A 5% sorbate dip along with 500 cc of 100% CO₂ was very effective for inhibition at 10 C. MVG
- 2253 OOSTEROM (J), NOTERMANS(S), KARMAN (H) and ENGELS (GB). Origin and prevalence of *Campylobacter jejuni* in poultry processing. *J. Food Prot.* 46(4); 1983; 339-44
 Intestinal contents of birds intended for processing contained upto 10⁷ C *Campylobacter jejuni* per gram. During scalding at 58 C, contamination was reduced. Number of *C. jejuni* in carcasses increased during defeathering and evisceration. Air cooling killed *C. jejuni* in some cases, probably due to drying. Processed chicken products contained 50% and 75% *C. jejuni* in carcasses and livers respectively. BSN
- 2254 DUTT (JA) and SPURGEON (TE). Multiresidue gas chromatographic method for determining organochlorine pesticides in poultry fat: Collaborative study. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 284-9
 A gas chromatographic EC detector method has been described for the determination of alpha-BHC, lindane, p, p'-DDE, p,p'-TDE, hexachlorobenzene, heptachlor epoxide, Dieldrin, Endrin, Methoxychlor, Mirex and Toxaphene in poultry fat. The samples are rendered and cleaned-up for automated gel permeation chromatography. Average recovery from fortified samples was 91.9%. JVS

CHICKEN

- 255 THOMAS (NL), GREY (TC), JONES (JM), ROBINSON (D) and STOCK (SW). Observations on the effect of age and sex on the nitrogen factor of chicken carcass parts including the edible offals. *J. Food Technol.* 19(1); 1984; 11-5
- 256 MTEMA (CA), NAKAZAWA (H) and TAKABATAKE (E). Rapid liquid chromatographic determination of clopidol in chicken muscles. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 334-6

Clopidol is a coccidiostat used in animal feeds; it should be withdrawn 7 days before slaughter to prevent the occurrence of residues in tissues. A rapid and sensitive LC method which enables the determination of clopidol at 0.01 ppm level has been described. A zorbax ODS column and acetonitrile-0.05M phosphate buffer were used in the method; the detection of clopidol was by UV absorption at 270 nm with 0.005 AUFS. JVS

BROILER

- 257 RAHAMATHULLA (PS), KRISHNAPPA (K) and RAMASWAMI (PS). Economics in a broiler farm. *Poult. Guide.* 21(5); 1984; 21-5
- 258 RICARD (FH), LECLERCQ (B) and TOURAILLE (C). Selecting broilers for low or high abdominal fat: Distribution of carcass fat and quality of meat. *Br. Poult. Sci.* 24(4); 1983; 511-6
- 259 BLANKENSHIP (LC), CRAVEN (SE), CHIU (JY) and KRUMM (GW). Sampling methods and frozen storage of samples for detection of *Campylobacter jejuni* on freshly processed broiler carcasses. *J. Food Prot.* 46(6); 1983; 510-13

TURKEY

- 2260 GREY (TC), ROBINSON (D), JONES (JM) and PRITCHARD (R). Observations on the composition and nitrogen factors of turkey meat. *J. Assoc. Public. Anal.* 21 (Part 1); 1983; 1-5
- 2261 RAYES (HM), GENIGEORGLIS (CA) and FARVER (TB). Prevalence of *Campylobacter jejuni* on turkey wings at the supermarket level. *J. Food Prot.* 46(4); 1983; 292-4

EGG

- 2262 LAL (GC). Role of cooperative in egg/poultry marketing in Uttar Pradesh. *Poult. Guide.* 21(1); 1984; 47-8
- 2263 TRUCKSESS (MW) and STOLOFF (L). Determination of aflatoxicol and aflatoxin B₁ and M₁ in eggs. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 317-20
- The sample is first mixed with water saturated with sodium chloride the resulting mixture is blended with acetone. After eliminating solid residue, the aqueous acetone extract is defatted with petroleum ether. The aflatoxins are then taken in chloroform for partitioning and freed of interfering substances on a silica gel column. Aflatoxicol is measured by

fluorescence after separation on a reverse phase chromatographic column; the aflatoxins B₁ and M₁ are estimated by fluorescence densitometry after separation on a silica gel TLC plate. JVS

- 2264 SCHMIDL (MK), SHIPE (WF), CHABOT (JF) and HOOD (LF). Preparation, ultra-structure, and functional properties of egg albumin and corn zein modified via the plastein reaction. *J. Food Process. Preserv.* 7(3); 1983; 131-42
Scanning Electron Microscopy (SEM) was used to study changes during the preparation of plasteins from egg albumin and corn zein protein isolates. This included an examination of protein particles that had been spray-dried, freeze-dried, hydrolyzed, and synthesized into plastein reaction products. Water holding capacity, oil binding capacity, and gel strength properties before and after modification are discussed. The study demonstrated that the quantity and quality of plastein products are dependent upon both the substrate and the enzyme used. A possible relationship is proposed between ultra-structural characteristics and actual functional performance of unmodified and modified proteins. AA
- 2265 HOLT (DL), WATSON (MA), DILL (CW), ALFORD (ES), EDWARDS (RL), DIEHL (KC) and GARDNER (FA). Correlation of the rheological behaviour of egg albumin to temperature, pH and NaCl concentration. *J. Food Sci.* 49(1); 1984; 137-41
Rheological parameters of viscosity, gel strength, and elasticity were determined on heat-set egg albumen gels over various treatment combinations ranging from 65-90 C, pH 6.4-9.6, and NaCl concentrations of 0.0-0.1 M added NaCl. Maximum viscosity was measured at a treatment combination of 77.5 C, pH 8.00, and 0.1 M NaCl. Elasticity and gel strength were highest in gels with a treatment combination of 85.2 C, pH 9.0, and 0.08 M NaCl. Temperature and the greatest effect on all three rheological parameters. Gels heated above 80 C were of unusual character, exhibiting syneresis and shrinkage. AA
- 2266 HAMID-SAMIMI (M), SWARTZEL (KR) and BALL (HR) Jr. Flow behaviour of liquid whole egg during thermal treatments. *J. Food Sci.* 49(1); 1984; 132-6
Flow properties of liquid whole egg at more than 60 C were studied to establish processing limits based on degree of coagulation. Above 60 C, viscosities depend on shear rate while at lower temperatures, they were approximately Newtonian. MVG

SEAFOODS

FISH

- 2267 MOHAN (RSL). Experimental culture of chanos in fish pans in a coastal lagoon at Mandapam. *Indian J. Fish.* 30(2); 1983; 287-95
- 2268 GOVINDAN (TK). Indian fisheries - a retrospect. IV. Preservation and processing. *Seafood Exp. J.* 16(1); 1984; 21-4
- 2269 JHAVERI (SN), KARAKOLTSIDIS (PA), MONTECALVO (J) Jr. and CONSTANTINIDES (SM). Chemical composition and protein quality of some Southern New England marine species. *J. Food Sci.* 49(1); 1984; 110-13

- 2270 KHOT (JB), SHERIKAR (AT) and KARALE (HV). Heavy metal concentration in some common edible fish sold in the city of Bombay. *Pesticides*. 18(1); 1984; 21-6
- 2271 STOREY (RM), DAVIS (HK), OWEN (D) and MOORE (L). Rapid approximate estimation of volatile amines in fish. *J. Food Technol.* 19(1); 1984; 1-10
Describes the application of available solid state gas sensor methods for measurement of volatile amines in fish and fish products. Data obtained is accurate and precise, especially for screening relatively large number of samples and require a small amount of the sample only. Potential applications of gas sensors are also discussed. BSN
- 2272 WATANABE (E), TOYAMA (K), KARUBE (I), MATSUOKA (H) and SUZUKI (S). Enzyme sensor for hypoxanthine and inosine determination in edible fish. *Appl. Microbiol Biotechnol.* 19(1); 1984; 18-22
The performance of an enzyme sensor proposed is described and its applicability to the estimation of freshness of edible fish is discussed. Xanthine oxidase (XO) and nucleoside phosphorylase (NP) were immobilised on a membrane similar to hypoxanthine and the XO-NP membrane was coupled with an oxygen electrode to construct an enzyme sensor. KAR
- 2273 WATANABE (E), TOYAMA (K), KARUBE (I), MATSUOKA (H) and SUZUKI (S). Determination of inosine-5-monophosphate in fish tissue with an enzyme sensor. *J. Food Sci.* 49(1); 1984; 114-6
The enzyme sensor comprised of immobilised enzymes and an oxygen electrode, and gave values comparable to the conventional method. It was stable for more than 15 days at 5 C. MVG
- 2274 TONOGAI (Y), KINGKATE (A), THANISSORN (W) and PUNTHANAPRATED (U). Enzymatic determination of L-glutamic acid (L-glutamate) in fish sauces and instant noodles. *J. Food Prot.* 46(6); 1983; 522-4
The enzymic method developed gave recoveries of more than 95% of L-glutamic acid from spiced samples of fish sauces or noodles. 33% over The regulatory levels of L-glutamic acid was recorded in 42 samples of fish sauces (pure and mixed) and 12 samples of instant noodles (noodles and powdered soup). BSN

CTENOCHAETES STRIGOSUS

- 2275 GOPINATHA PILLAI (CS), MOHAN (M) and KUNHIKOYA (KK). On an unusual massive recruitment of the reef fish (*Ctenochaetes strigosus* (Bennet) (Perciformes: Acanthuridae) to the Minocycl atoll and its significance. *Indian J. Fish.* 30(2); 1983; 261-8

HERRING

- 2276 THOMSEN (J) and GOTTFRED (L). Investigation on the occurrence of volatile nitrosamines in sugar-salted herrings prepared with or without addition of nitrates. *Z. Lebensmittel-Unters. Forsch.* 177(4); 1983; 261-3 (German)
112 samples of fish and pickles were selected on 4-5 occasions during the ripening period, and analysed for nitrosamines, by the method of (i) mineral oil distillation, (ii) gas chromatography, and (iii) the Thermal-Energy

Analyzer. No nitrosamines could be detected in 20 samples; the nitrosamine levels in 63 others was between 0.2 and 0.9 $\mu\text{g/kg}$; in another 24 samples it was between 1.0 and 1.9 $\mu\text{g/kg}$ and between 2.0 and 2.9 $\mu\text{g/kg}$ in the remaining 5 samples. Nitrosamine formation was not affected by addition of nitrate nor by the length of the ripening period. KMD

MACKEREL

- 2277 DHULKHED (MH) and ANNIGERI (GG). On a record-sized mackerel, *Rastrelliger kanagurta*, caught off Karwar. *Indian J. Fish.* 30(1); 1983; 183-4
A mackerel of 360 mm total length and 560 g weight, caught by a purse-seiner off Karwar, has been described. KMD

NEMIPTERUS JAPONICUS

- 2278 SRIRAMACHANDRA MURTY (V), Estimates of mortality, population size and yield per recruit of *Nemipterus japonicus* (Bloch) in the trawling grounds off Kakinada. *Indian J. Fish.* 30(2); 1983; 255-60

JELLYFISH

- 2279 HAMANO (T), MITSUHASHI (Y), TANAKA (K), MATSUKI KAWAKAMI (S), OJI (Y) and OKAMOTO (S). Effects of bleaching variables on residual sulphite content of salted jelly-fish. *Z. Lebensmittelunters. Forsch.* 177(4); 1983; 264-6

CLAM

- 2280 WAIT (DA), HACKNEY (CR), CARRICK (RJ), LOVELACE (G) and SOBSEY (MD). Enteric bacterial and viral pathogens and indicator bacteria in hard shell clams. *J. Food Prot.* 46(6); 1983; 493-6, 498

SQUID

- 2281 RODGER (G), WEDDLE (RB), CRAIG (P) and HASTINGS (R). Effect of alkaline protease activity on some properties of comminuted squid. *J. Food Sci.* 49(1); 1984; 117-9, 123
Results suggested that proteolysis of comminuted raw squid muscle by the highly active protease present in squid meat did not affect its sensory properties. MVG

PROTEIN FOODS

Nil

FRUIT JUICES AND BEVERAGES

- 2282 MONK (PR) and ILAND (PG). Ion-exclusion chromatography of carboxylic acids with conductimetric estimation. I. Methodology. *Food Technol. Aust.* 36(1); 1984; 16-7

A simple, inexpensive method is described and evaluated for the routine determination of carboxylic acids in beverages using ion-exclusion chromatography coupled with conductimetric detection. AA

FRUIT JUICES

- 2283 LINDSELL (RH). Long life fruit juices and fruit drinks. *Food Technol. Aust.* 35(4); 1983; 180-83

The design parameters of a processing plant for long life fruit juices, and fruit drinks, and the higher degree of sophistication, that leads to both in the thermal equipment and control systems used are broadly outlined. KAR

- 2284 MONK (PR) and ILAND (PG). Ion-exclusion chromatography of carboxylic acids with conductimetric estimation. 2. Application to fruit juice and wine. *Food Technol. Aust.* 36(1); 1984; 18-20

This method gives results similar to those achieved by the metavanadate colorimetric method for tartaric acid in grape juice and wine, and by enzymatic analysis of malic acid in grape juice and wine. For low concentrations of malic acid in wine, the method gives values higher than those obtained by enzymatic analysis. The method is also suitable for following malolactic fermentation in wine. KAR

GRAPE JUICE

- 2285 MONK (PR) and COSTELLO (PJ). Effect of ammonium phosphate and vitamin mixtures on yeast growth in preserved grape juice. *Food Technol. Aust.* 36(1); 1984; 25-8

Thiamin along with diammonium hydrogen orthophosphate improved yeast growth rate when they were added to juice preserved by sulphur dioxide. Other vitamins had no significant effect on yeast growth in the preserved juices. Yeast growth in all juices responded to the additions of DAP, particularly the cation exchange juice. KAR

ORANGE JUICE

- 2286 HADDAD (PR) and LAU (J). The use of high performance liquid chromatography for the analysis of ascorbic acid and dehydroascorbic acid in orange juice and powdered orange drink. *Food Technol. Aust.* 36(1); 1984; 46-8

Among the two methods viz. reversed-phase-ion pairing HPLC and the use of a CN column for the separation, the former was found to be subjected to interference problems and variability in retention times. The CN column method was more successful, particularly for powdered orange drink. KAR

PEAR JUICE

- 2287 PETROPAKIS (HJ) and MONTGOMERY (MW). Improvement of colour stability of pear juice concentrate by heat treatment. *J. Food Technol.* 19(1); 1984; 91-95

Boiling for 1 minute of clarified pear juice concentrate prepared from ascorbic acid treated fruit juices completely inactivated polyphenol oxidase activity (EC 1.14.18.1 monophenol monooxygenase). Greater colour stability as indicated by Hunter 'L' values and slower rates of browning were observed in heat treated pear juice concentrates stored for 6 months at 0, 20 and 38 C. BSN

TEA

- 2288 BASU (RP). Drying of Darjeeling tea. *Two Bud.* 30(1/2); 1983; 21-3
Aspects covered include: nature of fermented leaf; development of flavour during drying; requirements for good drying; volume of air supply; thickness of spread of leaf; perforation of drier tray; period of drying; single and double drying, output of driers and gapping. BSN

- 2289 NAGALAKSHMI (S), RAMASWAMY (MS), NATARAJAN (CP) and SESHADRI (R). The role of added carbohydrates in tea 'cream' solubilisation. *Food Chem.* 13(1); 1984; 69-77

The results of solubilisation studies of the 'cream' of tea infusions are reported. The addition of glucose, sucrose and maltodextrin to hot tea infusions was found to be ineffective. On the other hand, the incorporation of materials such as xylose, sorbitol, glucose, lactose, sucrose and maltodextrin at different levels into the distorted green leaves and subsequent fermentation for different periods resulted in solubilisation of the 'cream' to a large extent, in the following order of efficacy: monosaccharides > disaccharides > polysaccharides. This may be explained by the formation of tannin-carbohydrate-protein (enzyme) complexes in the fermenting leaf. AA

- 2290 CHOUDHURY (MND) and GOSWAMI (MR). A rapid method for determination of total polyphenolic matters in tea (*Camellia sinensis* L.). *Two Bud.* 30(1/2); 1983; 59-61

A simple, reproducible and convenient colorimetric technique for determination of polyphenols in tea shoots and in tea samples from various stages of tea manufacture has been developed using a phenol reagent. The results have been compared with that obtained from the application of Lowenthal method. BSN

- 2291 TAKEO (T) and MAHANTA (PK). Why CTC tea is less fragrant? *Two Bud.* 30(1/2) 1983; 76-7

Distilled aroma concentrates from (i) orthodox and (ii) CTC black teas, when subjected to gas chromatography and mass spectrometry revealed, that the amounts of the flavour components present were found to be higher in (i) than in (ii). The flavour components were mainly formed during processing of (i), whereas in (ii), colour predominated due to the higher amounts of theaflavin and thearubigin. BSN

COFFEE

- 2292 LEHMANN (G) and BINKLE (B). Comparative investigations on decaffeinated coffee. *Dtsch Lebensmittel-Rundschau*. 79(8); 1983; 266-9 (German)

Analysis of several samples of coffee, decaffeinated with methylene-chloride, showed no substantial differences in chlorogenic acid content as compared to untreated coffee samples. Decaffeinated coffee treated by the water-carbon-method showed lower quantities of chlorogenic acid than in those decaffeinated directly. AA

COCOA

- 2293 ANON. A survey of the cocoa industry in India. *Profodcil Bull.* 18(2/3); 1983; 9-15

The production, and marketing of cocoa in the country, and aspects of development of post-harvest technologies for better utilisation of cocoa are reviewed. MVG

- 2294 ABRAHAM (CS). Primary processing of cocoa beans. *Indian Cocoa Arec. Spices. J.* 7(2); 1983; 43-5

Aspects covered include, chemical changes in fermentation; basket type of fermentors; deciding the end point of fermentation, drying and storage of fermented cocoa beans. BSN

- 2295 KNEZEVIC (G). Heavy metals in foods. 3rd communication. On the content of arsenic in raw cocoa and in semi-finished and finished cocoa products. *Dtsch. Lebensmittel-Rundschau*. 79(7); 1983; 232-3 (German)

The arsenic content of cocoa and chocolate products was measured by the hydride technique, and found to be of the same order of magnitude as in other foodstuffs. The (As) metal content of finished cocoa products depended on: (i) origin of the raw cocoa; (ii) content of cocoa mass; and (iii) content of (As) metal in the other raw materials, like sugar, milk powder, hazelnuts, etc. Most (90%) of the cocoa consumed in Germany is in the form of milk chocolate which has the lowest As content among cocoa products; hence, the As load carried by cocoa products in Germany is quite low. Only two samples of cocoa (from Malaysia) contained more than 0.5 mg As/kg. KMD

WINE

- 2296 SURESH (ER), ETHIRAJ (S) and ONKARAYYA (H). Blending of grape musts for production of red wines. *J. Food Sci. Technol.* (India) 20(6); 1983; 313-4

Gulabi variety grape was blended with deep coloured Baily Alicante and Rubired variety in 2:1, 3:1 and 4:1 proportions to improve the wine colour. Wine from Rubired variety was deep coloured, but was highly acidic and astringent. To overcome this, it was blended with Thompson seedless and Anab-e-shahi grapes in proportions of 1:1, 1:2, 1:3 and 1:4. Blending of Gulabi with Baily Alicante or Rubired in 2:1 and 3:1 proportion gave good coloured wine. High acidity and tannin content of Rubired wine was reduced by blending with Anab-e-Shahi and Thompson seedless in the ratio of 1:1 to 1:4, a blend of 1:1 to 1:2 gave sufficient intensity of colour in dessert wine. Data on chemical composition of must and wine and on organoleptic evaluation of wine have been reported. KAR

- 2297 ROUS (CV), SNOW (R) and KUNKEE (RE). Reduction of higher alcohols by fermentation with a leucine-auxotrophic mutant of wine yeast. *J. Inst. Brew.* 89(4); 1983; 274-8
- 2298 DUCRUET (V), FLANZY (C), BOURZEIX (M), CHAMBROY (Y) and TACCHINI (M). Volatiles of young wines obtained by carbonic maceration. *Sci. Aliment.* 3(3); 1983; 413-26 (French)
- Volatile components of young wines obtained by carbonic maceration were extracted by a pentane (liquid-liquid extraction technique, 47 neutral components were identified by electronic impact and chemical ionization mass spectrometry combined with gas chromatography. Samples were characterized by the classical chemical values (pH, volatile and total acidities, alcoholic degree and other parameters phenolic substances, fusel alcohols). Many components with typical odours such as volatile phenols, ethyl and methyl vanillate, ethyl cinnamate are formed during anaerobic metabolism, comparison between profiles of wines made by carbonic maceration and grape crushing show that the main difference between the two types of wine is, the absence of 1-hexanol and 3-hexen-1-ol in the former. Two δ -lactones: 1-decalatone and δ -dodecalactone were identified for the first times in red wines. Slight quantitative differences have been noted for some highly odorous volatile components in both type of wine (γ -nonalactone, benzaldehyde, 2-phenylethyl acetate). AA
- 2299 LAWLESS (HT). Flavour description of white wine by "export" and 'nonexpert' wine consumers. *J. Food Sci.* 49(1); 1984; 120-23
- 2300 LAFON-LAFOURCADE (S), CARRE (E) and RIBEREAU-GAYON (P). Occurrence of lactic acid bacteria during the different stages of vinification and conservation of wines. *Appl. Environ. Microbiol.* 46(4); 1983; 874-80
- 2301 DALY (NM), LEE (TH) and FLEET (GH). Growth of fungi on wine corks and its contribution to corky taints in wine. *Food Technol. Aust.* 36(1); 1984; 22-4
- Species of *Penicillium*, *Trichoderma*, *Cladosporium*, *Paecilomyces*, *Rhizoctonia*, *mucor* and *Aspergillus* exhibited abundant growth on wine corks held at 20 C and a moisture content above 8% Corks contaminated with the growth of *Trichoderma* Spp. *P. granulatum* or *P. glabrum* transmitted a characteristic corky taint to wine and ethanol solutions. AA

BEER

- 2302 FUKAL (L), RAUCH (P) and KAS (J). A very sensitive method for assaying proteolytic activities in beer. *J. Inst. Brew.* 89(4); 1983; 257-9
- A very sensitive method for assaying chillproofing enzymes in beer is described using denatured ^{125}I -labelled human serum albumin as a substrate (40 C, pH 6.0 and 30 minutes reaction time). Less than 0.1 μg of papain in 1 ml of beer has been determined by this method. The results achieved by the proposed method were in good correlation with immunochemical and 'hide power azure' (HPA) methods. AA

BREWER'S YEAST

- 2303 STEWART (GG), PANCHAL (CJ) and RUSSELL (I). Current developments in the genetic manipulation of brewing yeast strains - A review. *J. Inst. Brew.* 89(3); 1983; 170-88
- 2304 DAY (A) and MEYLING (JC). Practical experience with rapid methods of detecting yeasts in breweries. *J. Inst. Brew.* 89(3); 1983; 204-6

HOP

- 2305 NEVE (RA). Hop production 1958-1983. *J. Inst. Brew.* 89(3); 1983; 164-9
Provides data on world hop area and production with special reference to Poland, GDR, Bulgaria, Romania, Hungary, USSR, Yugoslavia, Belgium, Czechoslovakia, USA, Austria, Japan, U.K. and FRG. BSN
- 2306 MENARY (RC), WILLIAMS (EA) and DOE (PE). Enzymic degradation of α -acids in hops. *J. Inst. Brew.* 89(3); 1983; 200-203
- 2307 GRIMMETT (CM) and PEPPARD (TL). The stability of hop oils in liquid carbon dioxide extracts of hops. *J. Inst. Brew.* 89(3); 1983; 207-9
Portions of extracts obtained by treating three varieties of hops with liquid carbon dioxide were stored in the cold and at ambient temperature for 18 months. During this period, the composition of hop oils remained stable, except for the formation of two terpene methyl sulphides in extracts from all three varieties. Ales were 'dry-hopped' using portions of the stored extracts and, despite formation of the two sulphur compounds, the resulting hop character was satisfactory in all cases. AA

MALT

- 2308 ATKINSON (B). Requirements for innovatory research in support of malting and brewing. *J. Inst. Brew.* 89(3); 1983; 160-63
Among the areas of innovatory research identified, emphasis has been laid on the need to understand comprehensively and in depth, the malting/brewing process. BSN
- 2309 MONTEBAULT (A), AUTRAN (JC) and JOUDRIER (P). Varietal identification of barley and malt. *J. Inst. Brew.* 89(4); 1983; 299-302
A vertical polyacrylamide - SDS electrophoretic technique, including whole protein extraction and staining steps, was improved with a view to developing it for routine laboratory use with single barley kernels. The pattern consisted for 4 zones: A (albumins-globulins), B and C (hordeins) and D (possibly glutelins) displaying unequal varietal polymorphisms (1, 13, 13 and 4 types respectively). 28% of the barley samples (77 varieties), including most cultivars grown in France, could be unambiguously identified from qualitative differences only, in the B, C and D zones. Adding three other characteristics (hairs and furrow hairiness, peroxidase, zymogram, esterase zymogram), as many as 78% of the varieties could be identified, the other 22% consisting of very closely related barleys. After slight modification of protein extraction conditions, the same methods could be used with malt, based on the same electrophoretic types. A graphic tablet connected to a microcomputer was used for automatic acquisitions of records of electrophoretic data. AA

- 2310 BRIGGS (DE) and MacDONALD (J). Patterns of modification in malting barley. *J. Inst. Brew.* 89(4); 1983; 260-73

The modified regions of the starch endosperms of malted grains were fragile and, in thin sections, the cell walls in these regions did not stain readily with Congo Red or Trypan Blue, although scanning electron microscopy demonstrated that some cell-wall material remained. Initially, the enzymes causing modification came from the scutellum, but later more came from the aleurone layer. Patterns of modification in different grains differed significantly, but usually resembled those recorded previously except that often modification had advanced further by the nucellar sheaf cells. In grains treated with gibberellic acid, modification advanced faster, particularly beneath the aleurone layer, after two days germination. In tumbled or commercially abraded grains malted with gibberellic acid, modification was even more rapid, but in more than 99% of the grains the same patterns of modification occurred. Two-way modification was a rare event. Rapid, general sub-aleurone modification occurred in grains cut at the apex and dosed with gibberellic acid. Decorticated grains modified exceptionally quickly and, when treated with gibberellic acid, massive subaleurone modification occurred. The cell walls of the tissues that resisted modification fluoresced strongly in ultra-violet light, in contrast to those of the starchy endosperm. AA

- 2311 MORGAN (AG), GILL (AA) and SMITH (DB). Some barley grain and green malt properties and their influence on malt hot-water extract. I. β -glucan, β -glucan solubilase and endo- β -glucanase. *J. Inst. Brew.* 89(4); 1983; 283-91

A study has been made of the variation between varieties in some properties of barley and malt and how this variation relates to malt hot water extract (HWE). The development of enzyme activity along the grain during germination was investigated. In this first paper we have examined β -glucan-related characters and found significant varietal variation in maximum enzyme activities and in the activities in different sections of grain during germination. Varietal variation was greater than environmental variation for each character. The fraction of β -glucan soluble in acid was the character most highly correlated with HWE. AA

- 2312 BERTOFT (E) and HENRIKSNAS (H). Starch hydrolysis in malting and mashing. *J. Inst. Brew.* 89(4); 1983; 279-82

Starch hydrolysis in malting and mashing processes was studied by gel chromatography on Sepharose CI 4B. The final molecular weight distribution of starch components in malt differs from those in barley. During malting, a molecular weight fraction close to the void volume appears as an intermediate product. Minor differences in starch hydrolysis in mashes with different malts is obtained, though the final dextrin composition of the worts is similar. AA

- 2313 BAMFORTH (CW) and MARTIN (HL). The degradation of β -glucan during malting and mashing: The role of β -glucanase. *J. Inst. Brew.* 89(4); 1983; 303-7

Significant β -glucanolysis takes place during mashing and is catalysed by a β -glucanase which is specific to mixed-linkage β -glucans. The enzyme develops during the germination of barley, but is rapidly and extensively destroyed in kilning. Partially-purified preparations of β -glucanase are protected from denaturation by heat, if their solutions are adjusted to pH 4 or if bovine serum albumin is added. However, the most effective stabiliser of the enzyme is reduced glutathione. Oligosaccharides containing three and four glucosyl units are produced by the action of β -glucanase and they are further converted during malting and mashing by a different enzyme(s) to diss-

- 2314 MORGAN (AG), GILL (AA) and SMITH (DB). Some barley grain and green malt properties and their influence on malt hot-water extract. II. Protein, proteinase and moisture. *J. Inst. Brew.* 89(4); 1983; 292-8

This paper continues the study of variation between varieties in some properties of barley and malt and examines protein-related characters and moisture uptake. Initial rate of moisture uptake was more closely related to enzyme activities than maximum moisture content. Significant varietal variation was found in all characters and this variation was greater than environmental variation with the exception of grain nitrogen concentration. In the endosperm, endopeptidase activity was the character most highly correlated with malt hot water extract (HWE). The combined influence of protein- and β -glucan-related characters was investigated and the relative influence of each group of characters on HWE varied in different sections of the grain. In the endosperm, the protein- and β -glucan-related characters accounted for 30% and 60% of the variation in HWE respectively.

- 2315 McWEENY (DJ). Nitrosamines in beverages. *Food Chem.* 11(4); 1983; 273-87
The chemical and biochemical processes involved in nitrosodimethylamine formation in malt, and in the treatments which can minimize this formation are discussed. KAR

- 2316 BAXTER (ED) and O'FARRELL (DD). Use of the friabilimeter to assess homogeneity of malt. *J. Inst. Brew.* 89(3); 1983; 210-14

A method has been developed for assessing the homogeneity of a sample of malt using the Friabilimeter. Material retained by the Friabilimeter sieve is further fractionated using a sieve with slits 2.2 mm wide by 23 mm long, as recommended by the EBC for assessing corn size. Material composed of unmodified grains and large pieces of endosperm is collected from the sieve and weighed. This gives a rapid and reproducible estimate of the proportion of unmodified material in the sample. The technique readily detects small quantities of unmodified grain added to a sample of malt. Staining half corns with Calcofluor gives similar scores for homogeneity but with poorer reproducibility and the technique is much slower. Staining with methylene blue gives much lower figures for homogeneity and is also slower and less reproducible than the Friabilimeter method. AA

WORT

- 2317 GIBSON (RM), LARGE (PJ), ANNESS (BJ) and BAMFORTH (CW). The identity of an inhibitor in wort of dimethyl sulphoxide reductase from yeast. *J. Inst. Brew.* 89(3); 1983; 215-8

CIDER

- 2318 KERNI (PN) and SHANT (PS). Commercial Kashmir apples quality cider. *Indian Food Packer.* 38(1); 1984; 78-82

Cider was prepared from 2 Kashmir apple c.v. Ambri and Red Delicious during 1977-79. Apple juice ameliorated at 24:0.225 per cent w/v sugar N balance was fermented at 18 ± 2 C. Physicochemical and organoleptic evaluation after 9 months of ageing revealed that sharp (Ambri) and sweet (Red-Delicious) apple cultivars are suitable for manufacture of cider. BSN

WHISKY

- 2319 RAMSAY (CM) and BERRY (DR). Development of a small scale mashing and fermentation system for studies on malt whisky production. *European J. Appl. Microbiol. Biotechnol.* 18(4); 1983; 207-13
- A technique has been developed to produce up to 10 l of fresh wort in laboratory conditions for use in small scale whisky fermentations. Neither boiled or sterilized wort can be used for this process. KAR

OILS AND FATS

- 2320 BILLET (Von R). Economy of vacuum rectification, especially for separation of thermally instable products. *Fette Seifen Anstrichm.* 85(2); 1983; 47-56 (German)

OILS

- 2321 PRZYBYLA (A). Oils : Oil selection key to many new products. *Process, Prepare. Food.* 152(4); 1983; 97-100
- Discusses: soyabean oil, cottonseed oil, corn oil, palm oil, sunflower oil, peanut oil, safflower oil, olive oil, coconut oil, lard and tallow. BSN
- 2322 BERNETTI (R), KOCHAN (SJ) and PIENKOWSKI (JJ). Karl Fischer determination of water in oils and fats: International collaborative study. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 299-301
- Sixteen laboratories analysed four samples, namely, a crude oil, a refined oil, an acid oil, and a deodoriser distillate, obtained during soyabean oil processing for fat content by Karl-Fischer method ISO/TC 34/SCII/N99. Interlaboratory variation was 15% at 0.3% moisture level, this was in line with the 10% variation suggested by AOCS at 0.5% level. JVS
- 2323 SENGUPTA (P) and SIL (S). Simple method for the estimation of polynuclear hydrocarbon in edible oils. *J. Oil Technol. Assoc. India* 15(3); 1983; 54-55
- First, the polynuclear hydrocarbons (PAH) are extracted by solvent partitioning, then separated on caffeine-impregnated, silica gel G plates, and finally estimated by "minimum dilution to extinction" technique. The average recovery ranged from 75 to 98%. KMD
- 2324 UHNAK (J), VENINGEROVA (M) and HORVATHOVA (I). Chlorinated pesticides residues in the production of edible oils. *Food Sci. + Technol.* 16(6); 1983; 323-5
- During technological operations in the manufacture of sunflower oil with low residual levels of pesticides in seeds (0.01-0.005 mg/kg⁻¹) decreases observed were: β -HCH 65.2%, α -HCH 33.9%, γ -HCH 20.9% and HCB 23.2%. Seeds with higher contents of pesticide residues (1,200-1,643 mg/kg⁻¹) in laboratory model experiments showed some decreases after neutralization and bleaching, but the highest decrease was after deodourization (up to 90%). AA

COTTONSEED OIL

- 2325 ZARINS (ZM), WILlich (RK) and FEUGE (RO). Solubilities of six cottonseed oil fatty acid methyl esters in methanol. *J. Am. Oil Chem. Soc.* 60(12); 1983; 2007-8.

Solubilities of six cottonseed oil fatty acid methyl esters in methanol have been determined. The esters were: methyl oleate, methyl linoleate, methyl malvalate, methyl dihydromalvalate, methyl sterculate and methyl dihydrosterculate. The solubility/temperature data are presented in graphical and tabular form. AA

PUMPKIN SEED OIL

- 2326 SCHUSTER (Von W), ZIPSE (W) and MARQUARD (Von). Influence of genotype and cultivation place on various ingredients of oil gourd seeds (*Cucurbita pepo* L.). *Fette Seifen Anstrichm.* 85(2); 1983; 56-64 (German)

MENHADEN OIL

- 2327 SEBEDIO (J-L) and ACKMAN (RG). Hydrogenation of a menhaden oil: 1. Fatty acid and C₂₀ monoethylenic isomer compositions as a function of the degree of hydrogenation. *J. Am. Oil Chem. Soc.* 60(12); 1983; 1986-91
- 2328 SEBEDIO (J-L) and ACKMAN (RG). Hydrogenation of a menhaden oil: II. Formation and evolution of the C₂₀ dienoic and trienoic fatty acids as a function of the degree of hydrogenation. *J. Am. Oil Chem. Soc.* 60(12); 1983; 1992-6

MUSTARD SEED OIL

- 2329 MARQUARD (Von R). Changes of seed ingredients of the following sorts of mustard: *Sinapis alba*, *Brassica juncea* and *Brassica nigra* under different climate variation in phytotron. *Fette Seifen Anstrichm.* 85(2); 1983; 77-86 (German)

PALM OIL

- 2330 KATO (A), YAMAOKA (M), GAPOR (Ab) and BERGER (KG). Tocopherols of oil palm leaf. *J. Am. Oil Chem. Soc.* 60(12); 1983; 2002

Tocopherols of oil palm leaves were determined by high performance liquid chromatography. Each tocopherol was identified by a combination of gas chromatography-mass spectrometry and thin layer chromatography. The extracts of the leaves contained α -tocopherol (11,229-14,805 $\mu\text{g/g}$) and β -tocopherol (30-44 $\mu\text{g/g}$). Tocopherol composition and content of the leaves was compared to those of oil palm fruits. AA

POMEGRANATE SEED OIL

- 2331 E1-SHAARAWY (MI) and NAHAPETIAN (A). Studies on pomegranate seed oil. *Fette Seifen Anstrichm.* 85(3); 1983; 123-6

Pomegranate seed oil forming approximately 15% of the seeds, has high refractive index and iodine value, with very low melting point. Spectrometric examination suggested presence of conjugation. Gas chromatographic analysis showed that 8% of its fatty acids were saturated, 10% monounsaturated. 10% diunsaturated and approximately 70% conjugated acid, most probably punicic acid. The oil properties places it in the industrially important group of drying oils. AA

RAPSEED OIL

- 2332 DAHLEN (JAH) and LINDH (LA). Mass balance of hexane losses in an extraction plant. *J. Am. Oil Chem. Soc.* 60(12); 1983; 2009-10

The hexane losses of an extraction plant processing rapeseed have been surveyed over a period of 5 months. The total average loss was 2.0 L/ton of seed according to inventory. By analyzing all discharge streams containing hexane, it was possible to make an accurate hexane mass balance. It was shown that almost 80% of the total loss was due to hexane residues in the desolventized and dried meal. AA

SAFFLOWER SEED OIL

- 2333 CONTE (LS), FREGA (N) and CAPELLA (P). Composition of the unsaponifiable oil fraction obtained from a number of cultivars of safflower. *J. Am. Oil Chem. Soc.* 60(12); 1983; 2003-6

Composition of the unsaponifiable matter obtained from oil extracted from six safflower cultivars (UC-1, Tara, S-541, S-202, S-317 and S-918) was determined. The composition of the fractions of sterols was related to fatty acid composition, and significant correlations were found between campesterol, Δ^7 -stigmastenol, oleic and linoleic acids. The composition of the fractions of terpenic alcohols and methyl sterols is also reported. AA

WINGED BEAN SEED OIL

- 2334 MURUGISWAMY (B), VAMADEVAIAH (HM) and MADALIAH (M). Fatty acid composition of winged bean seed oil (*Psophocarpus tetragonolobus*). *Fette Seifen Anstrichm.* 85(3); 1983; 121-2

VANASPATI LIKE FAT

- 2335 GEORGE (G) and SEN (DP). Preparation of vanaspati-like plastic fat by interesterification. *J. Oil Technol. Assoc India* 15(3); 1983; 46-51

The blends of (i) sal (*Shorea robusta*) fat and groundnut oil 30:70 wt/wt (sal-GNO) (ii) vanaspati-groundnut oil (40:60) (VP-GNO). (iii) sal fat and safflower oil (50:50) (Sal-saff) and (iv) cottonseed oil (CS) alone could be modified to give plastic fat with slip point of 33-34 by interesterification using sodium methoxide as a catalyst. Randomisation at 65 C for 30' was found to be sufficient for blends of Sal-GNO. Products involving VP-GNO, Sal-saff and CS required subsequent directed interesterification for a period of 24 hours at 25 C. BSN

FAT

- 2336 WURZIGER (J). The "lebensmittelkennzeichnungs-verordnung" (Regulation for food labelling) of 22 December 1981 in connection with fat and fat preparations in finished food products. *Fette Seifen Anstrichm.* 85(3); 1983; 106-11 (German)
- 2337 HALL (G) and ANDERSON (J). Volatile fat oxidation products. I. Determination of odour thresholds and odour intensity functions by dynamic olfactometry. *Food Sci. + Technol.* 16(6); 1983; 354-61
 Dynamic gas-dilution olfactometers have been built and used for the determination of odour properties of volatile fat oxidation products. A panel consisting of 12 judges selected from a larger group determined odour thresholds for 29 compounds. Odour intensity functions, i.e. relationships between perceived odour intensities and concentrations of single compounds, were determined for 14 compounds by an odour intensity matching technique, in which a concentration series of n-butanol was used as an intensity scale. The odour intensity function of butanol was determined in a separate experiment. AA
- 2338 HALL (G) and ANDERSON (J). Volatile fat oxidation products. II. Influence of temperature on volatility of saturated, mono- and di-unsaturated aldehydes in liquid media. *Food Sci. + Technol.* 16(6); 1983; 362-6
 Gas-liquid partition coefficients of flavour compounds are useful for calculating concentrations in either one of the two phases if the concentrations in the other phase are known. Odour properties, e.g. odour thresholds, determined as the concentrations in a certain liquid medium, can be transformed into the concentrations in the gas phase. This paper presents gas-liquid partition coefficients determined at 20, 30, and 40 C of saturated and unsaturated aldehydes commonly occurring in foods. The liquid media were vegetable oil, dioctyl phthalate, paraffin oil, and water. AA
- 2339 KROPPF (DH). New rapid methods for moisture and fat analysis: A review. *J. Food Quality.* 6(3); 1984; 199-210
 Methods for rapid analysis of fat and moisture in foods using microwaves, nuclear magnetic resonance, near infrared transmittance, electro-optical scanners, or measuring differential capacitance, near infrared transmittance, reflectance or absorbance, or specific gravity of a solvent-sample mixture have been described. KAR
- 2340 GERE (A). A complex procedure for the analysis of used frying fats. *Fette Seifen Anstrichm.* 85(3); 1983; 111-6
- 2341 LUKE (BG), RICHARDS (JC) and DAWES (EF). Recent advances in cleanup of fats by sweep co-distillation. Part I. Organochlorine residues. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 295-8
 A new commercial sweep co-distillation unit has been developed. It permits clean-up of residues from 10 fat samples simultaneously. Recoveries of residues of many organochlorine residues ranged from 83% to 105%; quantification of cleaned-up extracts is by GC using EC detector. JVS
- 2342 WASSERMANN (L). Lipids as baking aids. *Fette Seifen Anstrichm.* 85(3); 1983; 117-20 (German)

- 2343 WEIHRAUCH (JL) and SON (Y-S). The phospholipid content of foods. *J. Am. Oil Chem. Soc.* 60(12); 1983; 1971-8
- The content of total lipids and total and component phospholipids in about 140 foods has been compiled. Eggs, organ meats, lean meats, fish, shellfish, cereal grains and oilseeds are good sources of phospholipids, especially the choline phosphatides: phosphatidylcholine, sphingomyelin and lysophosphatidylcholine. Leafy vegetables, fruiting parts, roots and tubers are, with few exceptions, relatively poor dietary sources of total lipids and phospholipids. Foods or tissues in which the phospholipids perform similar functions also have similar relative phospholipid distributions. The use of conversion factors for calculating the total and individual phospholipids, sources of error, and research needs are discussed. AA
- 2344 SOE (JB). Analyses of monoglycerides and other emulsifiers by gas chromatography. *Fette Seifen Anstrichm.* 85(2); 1983; 72-6
- 2345 HERNQVIST (L) and ANJOU (K). Diglycerides as a stabiliser of the β -crystal form in margarines and fats. *Fette Seifen Anstrichm.* 85(2); 1983; 64-6

SPICES AND CONDIMENTS

- 2346 HOHMANN (B). Microscopic diagnosis of the leaves of spice - yielding plants. *Dtsch. Lebensmittel-Rundschau.* 79(7); 1983; 221-7 (German)
- The microscopic characteristics of the leaves of the clove tree (*Syzygium aromaticum*) and of bay leaves (*Pimenta dioica*) have been described, and a method of distinguishing between them has been reported. These leaves contain certain essential oils, and are likely to find use in spice mixtures, particularly in curry powder. KMD
- 2347 De BOER (E) and BOOT (EM). Comparison of methods for isolation and confirmation of *Clostridium perfringens* from spices and herbs. *J. Food Prot.* 46(6); 1983; 533-6
- 2348 RAHIMAN (BA) and NAIR (MK). Morphology, cytology and chemical constituents of some *Piper* species from India. *J. Plant Crops.* 11(2); 1983; 72-90
- A brief account of chemical constituents of piper species (*Piper* beetle, *P. longum*, *P. nigrum*, *P. attenuatum*, *P. sylvaticum*, *P. aurantium*, *P. officinarium*, *P. hookeri*, *P. tuberculatum*, *P. hispidum* var. *obliquum*, *P. trichostachyon*, *P. pepuloides* and *P. trachystachyum*) has been given. BSN

GARLIC

- 2349 CROCI (CA) and CURZIO (OA). The influence of gamma-irradiation on the storage life of "red" variety garlic. *J. Food Process. Preserv.* 7(3); 1983; 179-83
- Garlic bulbs from local cultivars were irradiated 30 days after harvest with a dose of 0.03 kGy of Co-60 gamma rays. A pilot scale sample was stored for 300 days in a commercial warehouse (6-32 C; 58-86 R.H.). At the end of the storage period, the irradiated garlic bulbs had lost 24% of their original weight. After 270 days of storage, 79.0 $\pm$ 8.4% of the irradiated bulbs were adjudged marketable. The process did not adversely affect the acceptability of the product. AA

TURMERIC

- 2350 PATIL (RB) and SAPKAL (RT). Studies on the curing percentage of some varieties of turmeric (*Curcuma longa* L.). *Indian Spices*. 20(2); 1983; 9-10
- 10 varieties (5 from Andhra Pradesh and 3 from Maharashtra and 2 from Tamil Nadu) of turmeric were investigated for curing percentages during 1977-78 and 1978-79. The crop was harvested after 8½ months at its maturity except one variety (Waigon) which was harvested after 7½ months. Immediately after harvest, the rhizomes were boiled uniformly in an iron pan and sun dried for 10 days. Polishing was carried out in a polishing drum. Results showed that there was variation in curing percentage among the varieties with the highest being 19.15 in Erode variety of Tamil Nadu and the lowest (14.00) was in Kasturi variety of Andhra Pradesh. The variations were attributed to the genetic characters. MVG

CARDAMOM

- 2351 BALAKRISHNAN (KV), GEORGE, (KM), MATHULLA (T), NARAYANA PILLAI (OG), CHANDRAN (CV) and VERGHESE (J). Studies in cardamom. I. Focus on oil of *Amomum subulatum* Roxb. *Indian Spices*. 21(1); 1984; 9-12

The essential oil extracted by steam distillation from the seeds of large cardamom was studied by gas chromatography. Results show some new components, namely, camphene, linalool, geraniol and neryl acetate, but there was no evidence of α -terpenyl acetate. Thus, it was shown that the composition of large cardamom differs substantially from that of true cardamom (*Elettaria cardamomum*), and its flavour is some what inferior to that of the latter. It is also a good source of 1:8-cineole. MVG

SENSORY EVALUATION

- 2352 SETSER (CS). Colour: Reflections and transmissions. *J. Food Quality*. 6(3); 1984; 183-97

The need for correlating instrumental measurement of colour to the sensory perception of visual appearance has been brought out. KAR

- 2353 LAWLESS (H) and SCHLEGEL (MP). Direct and indirect scaling of sensory differences in simple taste and odour mixtures. *J. Food Sci.* 49(1); 1984; 44-6

Differences between simple taste-odour mixtures were assessed by direct ratings of individual sensory attributes and by a forced-choice discrimination task. Two levels of citral and two levels of sucrose were combined factorially to produce four mixtures. The direct scaling of perceived sweetness and perceived intensity of lemon odour revealed no interactions of the components. However, Thurstonian scaled distances based on triangle test performance showed complex interactions. The difference in results observed with the two methods suggests that sensory data may have dramatically different implications, depending upon what a given task demands of the observer. AA

- 2354 KOKINI (JL), POOLE (M), MASON (P), MILLER (S) and STIER (EF). Identification of key textural attributes of fluid and semi-solid foods using regression analysis. *J. Food Sci.* 49(1); 1984; 47-51

A panel identified key attributes from 15 textural terms for 27 fluid and semifluid commercial foods. Predictive equations for 12 textural attributes were developed using the key textural attributes as independent variables. These final equations could be used for scores obtained for 'thick', 'soft' and 'slippery'. MVG

- 2355 CUTLER (AN), MORRIS (ER) and TAYLOR (LJ). Oral perception of viscosity in fluid foods and model systems. *J. Texture Stud.* 14(4); 1983; 377-95
- 2356 TUORILA-OLLIKAINEN (H), ALANKO (T) and HIRVI (T). Facial representation of sensory profiling data. *Food Sci. + Technol.* 16(6); 1983; 376-7

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

- 2357 BOWMAN (MC). Pesticides, their analysis and the AOAC: An over view of a century of progress (1884-1984). *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 205-9

A review of the era of crude pesticidal formulations based on concoctions (1884-1942) and synthetic organic pesticides (1942-present). JVS

- 2358 ANON. Pheromones-their role in insect pest control. *Int. Pest Control.* 25(2); 1983; 56-7
- 2359 MATTHEWS (GA). Research on controlled droplet application and other methods in relation to microbial pesticides. *Int. Pest. Control.* 25(1); 1983; 18-21
Discusses: systems of application (hydraulic sprayers, twinfold sprayers, thermal fogs, electrodynamic sprayers); and the problems of microbial insecticides in pest management. BSN
- 2360 GLYNNE JONES (GD). The use of piperonyl butoxide to increase the susceptibility of insects which have become resistant to pyrethroids and other insecticides. *Int. Pest Control.* 25(1); 1983; 14-5, 21
Discusses the increased effect on piperonyl butoxide on insects which have developed resistance to certain insecticides, particularly to the newer pyrethroids. BSN
- 2361 ENAN (EE). Comparative biochemical effects of three aliphatic organophosphorus insecticides on white rats. *Int. Pest Control.* 25(2); 1983; 42-5
- 2362 TYLER (PS), TAYLOR (RW) and REES (DP). Insect resistance to phosphine fumigation in food warehouses in Bangladesh. *Int. Pest Control.* 25(1); 1983; 10-13, 21
The failure of phosphine fumigation treatment was partly traced to the developing of phosphine-resistant insect population infecting stored grains in Bangladesh. As such, different treatments based on methylbromide were effectively employed for treatment of stored grain in both modern and traditional types of structures. BSN

- 2363 DAVIS (RA). Edible fat as a carrier for contact rodenticides. *Int. Pest Control.* 25(2); 1983; 46-7
- 2364 BORSETTI (AP) and THURSTON (LS). Gas chromatographic determination of pentachlorophenol in gelatin. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 275-7
 PCP is used as a fungicide on animal skins. When PCP-treated hides are diverted for gelatin (used in food products in USA) production the PCP residues are likely to cause trouble. In the present method, gelatin matrix is hydrolysed by heat/acid. A base partition, and wash for separation and clean-up as also reacidification and hexane extraction are carried out for direct determination of PCP by GC. A 1% SP-1240DA liquid phase and a nickel electron capture detector are used (limit of detection 4-6 ppb; renn 106% for fortification between 0.1-0.2 ppm). JVS

BIOCHEMISTRY AND NUTRITION

- 2365 CHEN (JY), PIVA (M) and LABUZA (TP). Evaluation of water binding capacity (WBC) of food fiber sources. *J. Food Sci.* 49(1); 1984; 59-63
- 2366 BOULET (M), CASTAIGNE (F) and RIEL (RR). Parameters influencing spun protein fibre properties. 1. Dope preparation. *Sci. Aliment.* 3(3); 1983; 323-50
 Various parameters involved in dope (collodion) preparation - type and concentration of protein, concentrations of salt and alkali-are considered, and their effects on the physico-chemical properties of the protein dopes are discussed. The action of alkali results in unfolding of the tertiary structure, and in strong molecular attractions, predominantly hydrophobic in nature. These interactions, plus formation of new S-S and lysinoalanine bonds, explain the large increase in the viscosity of protein dopes, under the influence of strong alkali. Alkali concentration is also the most important single factor affecting fibre texture, due to the persistence of molecular interactions and bonds during and after the transition of the dopes from the liquid to the gel state. KMD
- 2367 CASTAIGNE (F), BOULET (M) and RIEL (RR). Parameters influencing spun protein fibre properties. 2. Unit operations. *Sci. Aliment.* 3(3); 1983; 351-70
 Theoretical analysis of the phenomena involved in protein fibre fabrication is relatively complex. Two highly critical parameters of the process operations are extrusion and coagulation of the spinning dope, and stretching and washing of the fibres. Two phenomena are involved in coagulation: diffusion of ions from the coagulating solution to the fibre (or liquid jet), and diffusion of water from the fibre to the bath. Stretching is accomplished either mechanically, by the pull of winding cylinders, or by the friction of the moving liquid bath on the fibre. Washing of fibres is the last operation of spinning; it removes excess of acid and salt from the fibre. KMD
- 2368 HAPPICH (ML), BODWELL (CE), HACKLER (LR), PHILLIPS (JG), DERSE (PH), ELLIOTT (JG), HARTNAGEL (RE) Jr., HOPKINS (DT), KAPISZEKA (EL), MITCHELL (GV), PARSONS (GF), PRESCHER (EE), ROBAIDEK (ES) and WOMACK (M). Net protein ratio data; AACC-ASTM collaborative study. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 255-62
 The Net Protein Ratio (NPR) data were obtained from 7 laboratories and 6 protein sources. Five specifications have been laid down in order to use NPR as an alternative to protein efficiency ratio (PER) in assessing protein

quality. They are as follows: (a) the trial diet should contain 1.6% nitrogen obtained solely from the protein being assessed; (b) the NPR should be determined over 14-day periods; (c) there should be an adaptation period of 2-days for the rats; (d) ANRC casein should be used as reference protein; (e) and that NPR be expressed as R-NPR by a specific method of calculation given in the text. JVS

- 2369 SATTERLEE (LD). The C-PER, a rapid assay for protein nutritional quality. *J. Food Quality*. 6(3); 1984; 153-67
Aspects covered in the article include assays due utilizing proteolytic enzymes, microorganisms and the chemical score method. The C-PER (calculated protein efficiency ratio) assay has been discussed at length and the listing methodology has been elaborated and the strength and weakness of this assay method has been elucidated. KAR
- 2370 RAMESHWARA (NI), PAI (JS) and REGE (DV). Plastein: Biochemistry and applications. *Indian Food Packer*. 37(3); 1983; 29-45
Aspects covered include, optimum conditions for plastein reaction; mechanism of formation of enzyme; general properties of plasteins; methionine content; amino acid incorporation studies on zein; improvements of proteins of photosynthetic origin; improving solubility of plastein and proteins; removal of contaminants from proteins; and debittering of the proteolysate. BSN
- 2371 KARUNA KUMAR (M) and RADHAKRISHNAMURTHY (R). Effect of vitamin A deficiency on enzyme systems in different tissues of albino rats. *Indian J. Nutr. Dietet* 20(2); 1983; 60-65
- 2372 SREENIVASAN (A). Concepts of nutrition and health - Changing scenarios. *J. Oil Technol. Assoc. India*. 15(3); 1983; 61-6
The author in his J.G. Kane Memorial lecture reviewed the present status of knowledge on the dietary essentials of health, covering problems of affluence and poverty; the affluent diet-excesses, effects of lipids, carbohydrates (especially sugar), fibre, alcohol, and salt; protein-calorie malnutrition and protein deficiency; and current perspectives. KMD
- 2373 RAMADASMURTHY (V), LAKSHMIKANTHAM (M), NADAMUNI NAIDU (A) and MOHANRAN (M). Nutrition profile and scope for nutrition education of industrial workers. *Indian J. Nutr. Dietet*. 20(4); 1983; 118-127
- 2374 DEVADAS (RP), USHA CHANDRASEKHAR and BHOOMA (N). Nutritional outcomes of a rural diet supplemented with low cost locally available foods. II. Impact on nursing mothers. *Indian J. Nutr. Dietet*. 20(3); 1983; 71-8
- 2375 RAMAKRISHNAN (CV), PAREKH (LJ), SHAW (V), RAMCHAND (CN) and PARMAR (K). Role of microorganisms in improving nutritional status of the poor. *Baroda J. Nutr*. 10; 1983; 19-29
The contribution of intestinal microflora as well as the microorganisms involved in the fermented food consumed in India in improving the nutritional quality of the poor have been outlined. MVG
- 2376 ADAMSON (I), EASTWOOD (M) and BRYDON (WG). Comparison of the effect of yam, cassava and alfalfa on cholesterol metabolism in the rat. *Nutr. Rep. Int*. 27(3); 1983; 551-60

TOXICOLOGY AND HYGIENE

2377 GANGOLLI (SD). Toxicological aspects of food safety. *Food Chem.* 11(4); 1983; 339-46

2378 KAPHALIA (BS), HARISH CHANDRA, BHARGAVA (SK), SETH (TD) and GUPTA (BN). Lead in drinking water. *Indian J. Public Health.* 27(2); 1983; 64-9

Samples in and around Pilani (Rajasthan) were found to contain a very high concentration of lead ranging from 0.021 to 0.245 mg/l (average 0.088). Seven samples were found to contain lead above 0.1 mg/l. The lead levels of tank water in Cambay were considerably low ranging from 0.0-0.016 mg/l (average 0.006). Lead in tap, river and tube-well water samples from lucknow and Kanpur had an average concentration of 0.033, 0.033 and 0.020 mg/l respectively. The well water in Cambay connected at consumer's end were found to contain 0.024 mg/l lead.

2379 STELTE (W). The heavy metal content in canned soups as a function of storage time. *Dtsch. Lebensmittel-Rundschau.* 79(7); 1983; 227-31 (German)

Prior to canning, soups did not contain more Sn, Pb, Cd and Hg than is normally found in foods. Metallic contamination, as a result of canning, remains within fair limits, and consists mostly of tin (0.4 mg/kg), followed by Pb; Cd and Hg are hardly detectable. The Sn and Pb contents increased over a storage period of 4 months; the Cd content remained constant; and the Hg content decreased, and reached nearly zero value after 2-4 years. If lacquered cans are used, the soup may be stored for years without any fear of serious heavy metal contamination. KMD

2380 KIHLESTROM (I) and ODENBRO (A). Effect of triethyl lead on the placental uptake and transfer of the non-metabolizable α -aminoisobutyric acid in guinea pigs. *Toxicology.* 27(2); 1983; 111-8

2381 VORHEES (CV), BUTCHER (RE), BRUNNER (RL), WOOTTEN (V) and SOBOTKA (TJ). A developmental toxicity and psychotoxicity evaluation of FD and C Red Dye #3 (erythrosine) in rats. *Arch. Toxicol.* 53(4); 1983; 253-64

Two experiments were conducted to evaluate FD and C Red Dye #3 for its developmental toxicity and psychotoxicity. The treatment groups for Experiment 1 were Red Dye #3 as 0.0, 0.25, 0.5, or 1.0% of the diet (w/w), and a positive control group treated with the toxin hydroxyurea on days 2-10 of life (50 mg/Kg/day, s.c.); Experiment 2 was a replication of Experiment 1 with the same dose groups, but without the positive control group. Parental animals were evaluated for weight and food consumption, and females for reproductive success. The offspring were assessed on a series of tests using the Cincinnati Psychoteratogenicity Screening Test Battery, plus weight food consumption, physical landmarks of development, and brain weight. Red-3 produced no reduction in parental or offspring weight or food consumption. Red-3 significantly increased preweaning offspring mortality in the first experiment, but not in the second. Behaviourally, Red-3 produced no dose-dependent effects that replicated across the two experiments. It was concluded that no evidence was obtained that dietary exposure to FD and C Red Dye #3 (erythrosine) is psychotoxic to developing rats. AA

2382 HATFULL (RS). Survey of pesticide residues in foodstuffs, 1981. A report on behalf of the Association of Public Analysts. *J. Assoc. Public. Anal.* 21(Pt.1); 1983; 19-24

Reports results of a survey carried out in UK for the presence of pesticide residues on several fresh fruits and vegetables. BSN

- 2383 WINGER (PV), SIECKMAN (C), MAY (TW) and JOHNSON (WW). Residues on organochlorine insecticides, polychlorinated biphenyls, and heavy metals in biota from Apalachicola river, Florida, 1978. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 325-33

Seventy seven composite samples consisting of 7 different species of biota including clams and fishes were analysed, and data provided on organochlorine insecticides, polychlorinated biphenyls (PCB) and metals. Residue concentrations of DDT, PCBs and toxaphene in samples from upper river exceeded levels recommended as permissible for protecting aquatic life. Metal residues were generally below 1 mcg/g. JVS

- 2384 ROSE (GP) and DEWAR (AJ). Intoxication with four synthetic pyrethroids fails to show any correlation between neuromuscular dysfunction and neurobiochemical abnormalities in rats. *Arch. Toxicol.* 53(4); 1983; 297-316

- 2385 BRUNSTROM (B) and DARNERUD (PO). Toxicity and distribution in chick embryos of 3,3,4,4-tetrachlorobiphenyl injected into the eggs. *Toxicology.* 27(2); 1983; 103-10

- 2386 VIJAYA RAO (D) and GOPALA RAO (KR). Some characteristics of *Klebsiella* strains isolated from foods and water. *J. Food Sci. Technol.(India)* 20(6); 1983; 269-72

Klebsiella isolated from food and water belonged to three species. All the isolates grew well between 5-37 C; majority of them also grew at 45 C. about 45% of the isolates gave positive reaction for the faecal coliform test. Isolates from food exhibited hydrolytic activity on starch, protein and fat. *K. pneumoniae* isolate produced 2 types of Klebecin. Resistance to erythromycin sulphonamides, nitrofurantoin, ampicillin and furazolidone was shown by 65-100% of the isolates. Multiple resistance to 5 antibiotics was shown by >85% of the isolates. 4 types of resistance patterns were noted for isolates from foods and water. The former responded to lower minimal inhibitory concentration (below 100% µg/ml) among the 4 antibiotics tested. KAR

- 2387 VIJAYA RAO (D) and GOPALA RAO (KR). Incidence of *Klebsiella* in foods and water. *J. Food Sci. Technol.(India)* 20(6); 1983; 265-8

Samples of raw and pasteurised milk, raw mutton, fresh vegetables, spices, dehydrated foods including egg powder, mutton chunks and spiced mutton mince collected from commercial places and water from rivers and wells were analysed for standard plate count (SPC), coliforms and *Klebsiella*. Aerobic bacteria and coliforms were present in vegetables, meat and milk to the extent of 10^4 - 10^7 and 10^3 - 10^6 cells/g respectively. *Klebsiella* was abundant in raw milk (6-8% of coliforms) and vegetables (3-6% of coliforms). The SPC of processed foods (egg powder, meat and milk) ranged between 10^1 - 10^4 /g. SPC of water was 10^3 - 10^6 /100 ml and coliforms were 10^2 - 10^4 /100 ml of which *Klebsiella* content was $\leq 2\%$. 72% of river water had high coliform members; well water had lower SPC and no coliforms. City water had SPC of 10^2 - 10^4 /100 ml but coliform were $\leq 10^3$ /100 ml in 55.5% of samples. Milk and mutton contained all the 3 species of *Klebsiella* (*K. pneumoniae*, (ii) *K. ozaenae* and (iii) *K. oxytoca*) while the air dried instant mixes, vegetables, and spices contained only (i). Fresh vegetables showed (i) and (ii). (ii) was also detected in river water and treated waters. KAR

- 2388 WALLEN (SE). Understanding botulism. *Dairy Food Sanit.* 3(1); 1983; 4-8
Discusses: history and occurrence; history of scientific methods of home canning; organism and its classification; heat resistance; growth requirements; disease; CDC-emergency assistance; food involved; and prevention. BSN
- 2389 DOYLE (MP). Effect of carbon dioxide on toxin production by *Clostridium botulinum*. *European J. Appl. Microbiol. Biotechnol.* 17(1); 1983; 53-6
Ten strains of *C. botulinum* (5 type A and 5 type B) were tested for toxin production at pH 5.7 and temperature 30 C. At atmospheric pressure (101 KPa) 100 CO₂ delayed toxin production when compared with an atmosphere of 100% N₂. Increase in the pressure level of CO₂ further delayed the onset of toxin production; however, CO₂ at 891 KPa absolute did not totally inhibit production of toxin. KAR
- 2390 SMITH (JL), BUCHANAN (RL) and PALUMBO (SA). Effect of food environment on *Staphylococcal* enterotoxin synthesis: A review. *J. Food Prot.* 46(6); 1983; 545-55
Discusses: inoculum size and competing microbiota; atmospheric composition; carbon sources; temperature; acidity; sodium chloride; water activity-mineral ions; and sublethal injury. BSN
- 2391 JANIN (F), De BUYSER (M-L), LAPEYRE (C) and FEINBERG (M). Radioimmunological quantitative determination of *Staphylococcus aureus* enterotoxin A in various foods. *Sci. Aliment.* 3(3); 1983; 397-412
A quantitative, radio-immunological method, involving a 3-step purification which included gel filtration of the strain 722 culture supernatant, was adopted to determine *Staphylococcal* enterotoxin A. In a study of several observed food poisonings, it was found that the emetic dose of the toxin in contaminated foods is very low-close to 1 µg/g. Bioanalytical techniques proved to be very efficient for the checking of suspected samples. A large number of samples can be analyzed in 24 hours, with a detection threshold of 0.3 ng/g of food. The presence of other enterotoxin types, or of a large number of bacteria, does not lead to false positive results. KMD
- 2392 SUNITA AGARWAL. Moulds, mycotoxins and mycotoxicoses. *Sci. Rep.* 20(1); 1983; 25-28, 42
- 2393 CHANG-YEN (I), STOUTE (VA) and FELMINE (JB). Effect of solvent composition on aflatoxin fluorescence. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 306-8
The influence of chloroform-methanol solvent system on the fluorescence of aflatoxins B₁, B₂, G₁ and G₂ was investigated. Fluorescence intensity is markedly affected by solvent composition. The formation of excited state dimers and ionization are proposed to explain the effects observed. AA
- 2394 HAGLER (WM) Jr., HUTCHINS (JE) and HAMILTON (PB). Destruction of aflatoxin B₁ with sodium bisulphite: Isolation of the major product aflatoxin B₁S. *J. Food Prot.* 46(4); 1983; 295-300, 304
- 2395 GUPTA (M), SASMAL (D), BANDYOPADHYAY (S), BAGCHI (G), CHATTERJEE (T) and DEY (S). Hematological changes produced in mice by ochratoxin A and citrinin. *Toxicology.* 26(1); 1983; 55-62
The effect of 6 weekly injections of ochratoxin A (5 mg/kg) and citrinin (20 mg/kg) on the following hematological indices of mice was studied: erythrocyte sedimentation rate, hematocrit percentage, mean corpuscular values,

red cell indices, platelet count, total count of bone marrow cells, differential count of bone marrow cells, total count of splenic cells, spleen weight, and serum calcium. These mycotoxins resulted in a significant decrease in platelet count and hematocrit values. On the other hand, they increased erythrocyte sedimentation rate, mean corpuscular values and red cell indices. Weight of the spleen and the splenic cell count decreased significantly in ochratoxin A and citrinin treated mice. Total count of bone marrow cells, erythrocyte precursors, leucocyte precursors and megakaryocyte precursors of femoral bone marrow decreased significantly in toxin treated mice. Calcium concentration in the serum of toxin treated mice also was decreased significantly. AA

2396 MAYURA (K), HAYES (AW) and BERNDT (WO). Effects of dietary protein on teratogenicity of ochratoxin A in rats. *Toxicology*. 27(2); 1983; 147-57

2397 CLIVER (DO), ELLENDER (RD) and SOBSEY (MD). Methods to detect viruses in foods: Testing and interpretation of results. *J. Food Prot.* 46(4); 1983; 345-57

Discusses: viruses as pathogens; handling food samples; virus detected in field samples; virus persistence; virus in shell fish and its determination; vegetables, fruits and animal products - methods of testing for presence of viruses and their control techniques; cell cultures for food virology; assay procedure and inoculation of cell culture; interpretation of positive and negative results. BSN

GENERAL

- 2398 JAGJIT SINGH. Indian scientific and technological culture since independence. *Sci. Rep.* 20(5); 1983; 260-63, 296
- 2399 PRZYBYLA (A). Breakthroughs occurring in genetically engineered crops. *Process Prepare. Food.* 152(6); 1983; 101-3, 104
- 2400 HEINZ (S) and HOLZAPFEL (G). The co-operation of agriculture and food industry as basis of the sufficient nutrition. *Lebensmittel-industrie.* 30(5); 1983; 193-200 (German)
- 2401 BORKMANN (K). Economical use of raw materials as result of scientific technical measures. *Lebensmittel-industrie.* 30(6); 1983; 241-2 (German)
- 2402 SEIDEMANN (J). About the efficiency of laboratory results from the standpoint of quality control and quality assurance. *Lebensmittel-industrie.* 30(6); 1983; 257-64 (German)
- 2403 MORGAN (RE). Navy food service - past, present and future. *Activities Report.* 35(2); 1983; 4-7
- 2404 HERTEL (W). Pollution control and food production. *Getreide Mehl Brot.* 37(9); 1983; 259-62 (German)
- Recent West German legislation on pollution control, especially the use of pesticides, has been analyzed, and it is concluded that the West German population may eat its daily bread with a good appetite and without any discomfort. However, the bad effects of earlier carelessness, in the use of polychlorinated biphenyls and hexachlorohexane will persist for some more time.
- KMD
- 2405 GLADISCH (K). Decrease of the specific transport costs by optimization of production and transport. *Lebensmittel-industrie.* 30(6); 1983; 243-4 (German)
- 2406 FECHNER (J). Application of a model of the optimization of production and transport by efficient layout of the structure of production and sales. *Lebensmittel-industrie.* 30(6); 1983; 245-7 (German)
- 2407 BRACHT (TJ). Possibilities of qualitative and technological variations in the bulk delivery of flour. *Getreide Mehl Brot.* 37(6); 1983; 172-5 (German)
- To ensure a good end product from bakeries that store flour in silos, the following three requirements must be met: (i) good silo equipment; (ii) a well-equipped laboratory; and, most important of all, (iii) trained personnel to bridge the gap between the baker and flour millers who can understand and explain frankly the problems of both sides. KMD

FOOD PROCESSING AND PACKAGING

PROCESSING

- 2408 MUNZING (K). Possibilities and limits of a new method of grain ventilation. Part 1. Ventilation drying with dehumidifiers. *Getreide Mehl. Brot.* 37(7); 1983; 198-202 (German)

The use of dehumidified air - using hygroscopic lithium chloride crystals - has been recommended for drying grain without incurring extra energy costs. The time required to dry freshly harvested lots of wheat and rye can be considerably reduced. The quality of the grain was not affected. It is necessary to employ some method of heat recovery, when the moisture adsorbing agent is being regenerated. KMD

- 2409 MUNZING (K). Possibilities and limitations of new operations for grain ventilation. Part 2. Grain ventilation, using spontaneous heating. *Getreide Mehl Brot.* 37(10); 1983; 291-5 (German)

A new process, called the FGK process (ventilate, keep sound or healthy, preserve), has been proposed, wherein the heat generated by the grain itself is used to ventilate it, and thus effect a saving in energy. Trials have shown that these expectations have not been fulfilled, and that it is not sufficient to allow freshly harvested grain to stand by itself in a heap to preserve it. Several deleterious changes in germination quality, glutamic acid decarboxylase activity, protein quality, and starch quality were noted when this was done. KMD

- 2410 NICOLAS (M-G) and DUPRAT (F). Determination of potassium nitrate diffusivity in model systems. Preliminaries to extraction study of soluble compounds during blanching. *Sci. Aliment.* 3(4); 1983; 615-28 (French)

Two methods of measuring the diffusivity of nitrate (KNO_3) ions in double-distilled water have been compared, viz. (a) the diaphragm (or Stokes) cell method, and (b) extraction with water of cylinders prepared with a solution of potassium nitrate and immobilised by adding varying amounts of agarose. The latter method was also used to study the effects of temperature and stirring on the diffusivity. The two methods gave similar values for diffusivity - between 1.87 and $1.91 \times 10^{-9} \text{ m}^2/\text{s}$. Temperature and diffusivity are correlated by an Arrhenius Law: the activation energy is 11.6 kJ/mole . Low stirring results in a lower diffusion, because of the presence of a boundary layer. KMD

PACKAGING

- 2411 McCORMICK (RD). Packaging - the final ingredient. *Process. Prepare. Food.* 152(7); 1983; 107-108,111

- 2412 TERWILLIGER (F). Coextruded plastics leading in search for new packaging. *Process. Prepare. Food.* 152(7); 1983; 76

- 2413 ANON. Power packaging moves into aseptic products. *Process. Prepare. Food.* 152(7); 1983; 78-9

- 2414 SAITO (Y). The retort pouch is a way of life in Japan. *Activities Report*. 35(2); 1983; 8-13
- 2415 LONG (FE). Development of non-destructive testing devices for insuring pouch integrity. *Activities Report*. 35(2); 1983; 14-8
- 2416 GREENE (R). Designing thermal processes for optimizing product quality in retort pouches. *Activities Report*. 35(2); 1983; 19-24
- 2417 HOGG (MD). Retort pouch prospects in England. *Activities Report*. 35(2); 1983; 25-8
- 2418 GROSSJOHANN (H). Advanced methods for thermally processing retort pouches and half trays using steam and air principles. *Activities Report*. 35(2); 1983; 29-33, 40
- 2419 HETTINGER (RF). Continental's 1/3 menu tray, package innovation-revolution or evolution? *Activities Report*. 35(2); 1983; 34-40
- 2420 DUNGAN (AL). Establishing a responsive tray pack industrial base - An overview. *Activities Report*. 35(2); 1983; 41-5
- 2421 ROY (S). The combat field feeding system tray pack testing results including the Fort Hood October 1982 test. *Activities Report*. 35(2); 1983; 46-50

FOOD ENGINEERING AND EQUIPMENT

- 2422 DECAREAU (RV). Microwaves in food processing. *Food Technol. Aust.* 36(2); 1984; 81-6

The advantages of microwave processing and the microwave processing applications in the food industry including those of pasta product drying, tempering of frozen food products, precooking of poultry parts, miscellaneous microwave processes and the future of microwave food processing have been discussed. KAR

- 2423 SUCCAR (J) and HAYAKAWA (K-I). Empirical formulae for predicting thermal physical properties of food at freezing or defrosting temperatures. *Food Sci. + Technol.* 16(6); 1983; 326-31

Empirical equations for the prediction of apparent specific heat, thermal conductivity and density during freezing or defrosting are developed by modifying or reapplying Schwartzberg's equations. Through a nonlinear parameter estimation procedure on thermophysical properties available in the literature, constants appearing in these equations have been estimated for a wide variety of food products. Comparison to other published formulae shows that the proposed equations yield better correlation between experimental and predicted data. AA

- 2424 FIKLIN (AG). New nomograms for the graphic determination of parameters of the refrigeration process for foods. *Lebensmittel-industrie.* 30(6); 1983; 248-54, 289, 290 (German)

New, precise, and detailed nomograms which reflect the relationship between the temperature field $(H) = \frac{t_\tau - t_o}{t_a - t_o}$, the Fourier criterion $F_0 = a / R^2$

and the Biot criterion $Bi = \frac{h}{\lambda} \cdot R$ have been devised for the process of refrigeration of solid foods. They have been calculated with the help of a computer, using six terms of the Fourier series. The nomograms can be used to optimize the parameters of the refrigeration process and its duration. KMD

- 2425 HILLE (B). The new plate heat exchanger PA 5 - contribution to the saving of material and energy. *Lebensmittel-industrie*. 30(5); 1983; 201-2 (German)
- 2426 ADAMS (JP), SIMUNOVIC (J) and SMITH (KL). Temperature histories in a UHT indirect heat exchanger. *J. Food Sci.* 49(1); 1984; 273-7
- 2427 BILLET (Von R). Application and operating limits of thin film evaporators. *Fette Seifen Anstrichm.* 85(3); 1983; 93-8 (German)
- 2428 REICHERT (RD), OOMAH (BD) and YOUNGS (CG). Factors affecting the efficiency of abrasive-type dehulling of grain legumes investigated with a new intermediate-sized, batch dehuller. *J. Food Sci.* 49(1); 1984; 267-72
- An intermediate-sized, batch dehuller with a capacity 2-8 kg of cereals and legumes was developed and tested for yield and efficiency. The dehuller was simple to operate and maintain and does not require seeds of uniform size or shape. It could be used effectively where sample cross contamination was undesirable. It was tried on soyabean, faba bean and field pea with high efficiency while with mung bean and cow pea it showed low efficiency. Its application as a screening tool is also discussed. BSN

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

- 2429 LEE (CM), SHERR (B) and KOH (Y-N). Evaluation of kinetic parameters for a glucose-lysine Maillard reaction. *J. Agric. Food Chem.* 32(2); 1984; 379-82
- Glucose-lysine Amadori compounds were prepared by eluting refluxed reaction products through a Dowex 50W-X4 column by using 0.2 M pyridine-acetic acid buffer of pH 4.25 and confirmed by an Avicel TLC. The kinetics of the formation of Amadori compounds (monofructosyllsine, MFL; difructosyllsine, DFL) and brown pigment were studied with respect to temperature and pH under closed and isothermal conditions. Amadori compounds were formed at an exponential rate while showing a pseudo-first-order degradation of lysine in the presence of excess glucose. One-hour refluxing in metanol reduced 50% of lysine without an apparent pigment formation. A breakpoint for the pH-dependent reaction rate for the formation of MFL, DFL, and pigment was found to be at pH 6 at all temperatures studied. The pH dependency of the reaction rate was decreased with an increase in reaction temperature. Computed E_a ranged from 8.5 to 5.7, 11.5 to 6.3, and 18.0 to 5.1 kcal mol⁻¹ for MFL, DFL, and pigment, respectively, at pH 4-7. AA
- 2430 MORRIES (P). A century of Kjeldahl (1883-1983). *J. Assoc. Publ. Anal.* 21(pt.2); 1983; 53-8

- 2431 LANGE (R), FRIEBE (R) and LINOW (F). On the use of the Kjeldahl wet digestion/Berthelot reaction combined method for determining nitrogen in biological materials. Part VI. The block digestion technique on the semi-micro and the macro level as applied to biological solids. *Nahrung*. 27(7); 1983; 645-58 (German)

A method for determining nitrogen in biological solids has been described using the block digestion technique on the semi-micro and the-micro level. The analytical parameters (calibration function, optimum working range, blank reading, limit of detection, and others) of the procedure are reported. Differences between samples in physical properties, chemical composition, nitrogen content and amounts available for analysis can be considered. There are no problems as to heterogeneity or inhomogeneity of sample materials. Apart from functional nitrogen groups (amino, amide or peptide groups) that prevail in biological materials, nitrogen bound by heterocyclic or aromatic linkage can be determined accurately. The standard deviations are: 1.9 mg nitrogen/g substrate on the semi-micro level, and 2.6 mg nitrogen/g substrate on the macro level. AA

- 2432 DULL (BJ) and HOTCHKISS (JH). A rapid method for estimating nitrate in biological samples using gas chromatography with a flame-ionization detector or a thermal energy analyzer. *Food Chem. Toxicol.* 22(2); 1984; 105-8

A simple, rapid method for estimating the nitrate content of biological samples was developed and tested. The method was based on the nitration of benzene under acidic conditions. The resulting nitrobenzene was analysed by gas chromatography with either a flame ionization detector (FID) or a Thermal Energy Analyzer (TEA) for detection. Recovery of nitrate added to urine, blood, saliva or faeces was 96, 97, 96 and 98%, respectively. Coefficients of variation for repeated analyses ranged from 2.2% for saliva to 12% for blood. Sensitivity was of the order of 0.5-1.5 mg/kg for the FID and 0.02-0.05 mg/kg for the TEA. AA

- 2433 STEVENS (RA). The adaptation of an atomic absorption spectrophotometer for ELISA plate reading. *J. Assoc. Publ. Anal.* 21 (pt.2); 1983; 67-9

Describes briefly the design, construction and application of a module for reading ELISA plates on an Atomic Absorption Spectrophotometer, intended for use in determination of soy in meat products. BSN

- 2434 KYREIN (HJ). The radioimmunoassay for steroid hormones fundamentals, development and application of radioimmunoassays. Part I. Fundamentals. Part II. Development and application of radioimmunoassays. *Z. Lebensmittel-Unters. Forsch.* 177(6); 1983; 415-38 (German)

- 2435 SCHOLZ (E). Water determination in foodstuffs: Pyridine-free Karl Fischer reagents. *Dtsch. Lebensmittel-Rundschau*. 79(9); 1983; 302-6 (German)

The pyridine-free KF reagents in foods require titration time of 2 to 10 minutes. For some foods it will be expedient to titrate at 50 C, since the water will then be more quickly extracted than at room temperature. Addition of chloroform or formamide improves the solubility of the samples. AA

- 2436 KATO (A), MATSUDA (T), MATSUDOMI (N) and KOBAYASHI (K). Determination of protein hydrophobicity using a sodium dodecyl sulphate binding method. *J. Agric. Food Chem.* 32(2); 1984; 284-8

An attempt has been made to determine the protein hydrophobicity by using sodium dodecyl sulphate binding method. The relationship between the surface hydrophobicity and SDS-binding capacity of 14 different proteins has been described. IVS

- 2437 Van NIEKERK (PJ), SMIT (SCC), STRYDOM (ESP) and ARMBRUSTER (G). Comparison of a high-performance liquid chromatographic and microbiological method for the determination of niacin in foods. *J. Agric. Food Chem.* 32(2); 1984; 304-7

A HPLC method for niacin using the approach of column switching to improve separation has been developed. An alkaline extract of a millet has been used for HPLC. The recovery by this method was 100.1% and by microbiological method 101.1%. The HPLC method has a detection limit of 0.5 mg of niacin per 100 g of sample when a 5 g sample is extracted and diluted to 100 ml. The chromatogram can be completed in 1 hour. JVS

FOOD LAWS AND REGULATIONS

- 2438 HATCH (SO). Areas for change in the food and drug laws. *Food Drug Cosmet. Law J.* 38(2); 1983; 97-102

Discusses: food safety legislation; voluntary sodium labeling; encouraging pharmaceutical innovation; drug export policy; new drug proposals; non prescription drugs; and animal testing. BSN

FOOD MICROBIOLOGY

- 2439 BUCKENHUSKES (H). Report on the 4th Filderstadt Colloquium of the Association of Food Technologists. "Biotechnology, Waste Water, Recycling of Wastes", 8th October. 1982. *Gordian.* 83(1+2); 1983; 24-6 (German)

Summaries of the following papers have been given: GOTZLER (P) - Production and properties of carrier bound enzymes; and their application in the food industry; HUSTEDE (H) - Production of citric acid - process, raw materials and wastes, WINTER (J) - Formation of methane and its practical application in the production of biogas; CLAUS (G) - Microbiological possibilities of purifying strongly smelling waste gases during food production, REIMANN - Processes and plants for purification of food industry effluents; KICHERER (M) - Microbiological purification and working up of the effluents of saurkrant production; and KRAYL (D) - Modern process for preparation and use of whey. KMD

- 2440 NIEBERGALL (H) and HARTMANN (M). New measuring cells for static and dynamic migration: Development and application. *Food Sci. + Technol.* 17(5); 1983; 263-9

- 2441 COONEY (CL). Bioreactors: Design and operation. *Science.* 219(4585); 1983; 728-33

Discusses: objectives in design; biological reaction kinetics; approaches in bioreactor design; limitations in bioreactor operation and design; and trends and future directions in bioreactor development. BSN

- 2442 DEMAINE (AL). New applications of microbial products. *Science.* 219(4585); 1983; 709-14

Discusses; antiparasitic activities; insecticides and herbicides; plant growth regulators; pharmacological action of microbial metabolites; enzyme inhibitors; other *in vitro* tests; and other enzyme assays. BSN

ENZYMES

- 2443 KLIBANOV (AM). Immobilized enzymes and cells as practical catalysts. *Science*. 219(4585); 1983; 722-7

Discusses: immobilization of enzymes and cells; stabilization of cells by immobilization; properties of immobilized enzymes and cells; applications of immobilized biocatalysts; and future developments; and opportunities and challenges. BSN

FERMENTATION

- 2444 WESENBURG (J), KNEBUSCH (M) and SEYFARTH (W). Techniques for the analysis of fermentation by-products in fermentation media and final products by gas chromatography. 1. Present status and trends. *Lebensmittel-industrie*. 30(6); 1983; 265-72 (German)

The authors have first reviewed the international literature on the application of gas chromatography to the analysis of fermentation media and the end-products of the fermentation industry. Their own work on improving the preparation of samples, development of devices, injection, packing of separation columns, detection, evaluation, calibration, standards, and experimental errors has been reported. KMD

ALGAE

- 2445 PIORRECK (M), BAASCH (K-H) and POHL (P). Biomass production, total protein, chlorophylls, lipid and fatty acids of fresh water green and blue-green algae under different nitrogen regimes. *Phytochemistry*. 23(2) 1984; 207-16

Two green algae (*Chlorella vulgaris* and *Scenedesmus obliquus*) and four blue-green algae (*Anacystis nidulans*, *Microcystis aeruginosa*, *Oscillatoria rubescens* and *Spirulina platensis*) were grown in 81 batch cultures at different nitrogen levels. In all the algae, increasing N levels led to an increase in the biomass (from 8 to 450 mg/l), in protein content (from 8 to 54%) and in chlorophyll. At low N levels, the green algae contained a high percentage of total lipids (45% of the biomass). More than 70% of these were neutral lipids such as triacylglycerols (containing mainly 16:0 and 18:1 fatty acids) and trace amounts of hydrocarbons. At high N levels, the percentage of total lipids dropped to about 20% of the dry weight. In the latter case, the predominant lipids were polar lipids containing polyunsaturated C₁₆ and C₁₈ fatty acids. The blue-green algae, however, did not show any significant changes in their fatty acid and lipid compositions, when the nitrogen concentrations in the nutrient medium were varied. Thus, the green, but not the blue-green algae can be manipulated in mass cultures to yield a biomass with desired fatty acid and lipid compositions. AA

- 2446 PIORRECK (M) and POHL (P). Formation of biomass, total protein chlorophylls, lipids and fatty acids in green and blue-green algae during one growth phase. *Phytochemistry*. 23(2); 1984; 217-23

Batch cultures (8-32 l.) of *Chlorella vulgaris*, *Scenedesmus obliquus*, *Anacystis nidulans* and *Microcystis aeruginosa* were grown in media containing 0.001% KNO₃ and at several stages in growth sampled for biomass, total protein, chlorophylls, lipids and fatty acids. With increasing time and decreasing nitrogen concentrations, the biomass of all of the algae increased, whereas

the total protein and chlorophyll content dropped. Green and blue-green algae, however, behaved differently in their lipid metabolism. In the green algae, the total lipid and fatty acid content as well as the composition of these compounds changed considerably during one growth phase and was dependent on the nitrogen concentration in the media at any given day of growth. More specifically, during the initial stages of growth, the green algae produced larger amounts of polar lipids and polyunsaturated C₁₆ and C₁₈ fatty acids. Towards the end of growth, however, these patterns changed in that the main lipids of the green algae were neutral with mainly saturated fatty acids (mostly 18:1 and 16:0). Such changes did not occur in the blue-green algae. These differences between prokaryotic and eukaryotic algae can possibly be explained by the 'endosymbiont theory'. AA

- 2447 ANUSUYA DEVI (M) and VENKATARAMAN (LV). Supplementary value of the proteins of blue-green algae *Spirulina platensis* to rice and wheat proteins. *Nutr. Rep. Int.* 28(5); 1983; 1029-35

Algal protein was fed (25 and 50% of total proteins) to rice and wheat diets. Supplementation of rice and wheat diets with algae in the ratio of 3:1 led to significant improvement in the PER when compared to cereal diet alone. The highest PER was obtained for diets containing algae and rice protein in the ratio 1:1. KAR

LACTIC ACID BACTERIA

- 2448 De SILVA (MCT), TESSI (MA) and MOGUILEVSKY (MA). Preservation of lactic acid bacteria on anhydrous silica gel for three years. *J. Food Prot.* 46(8); 1983; 699-701

PSEUDOMONAS FLUORESCENS

- 2449 MARIN (A) and MARSHALL (RT). Characterization of glycosidases produced by *Pseudomonas fluorescens*. 26. *J. Food Prot.* 46(8); 1983; 676-80

STREPTOCOCCUS LACTIS

- 2450 EL-GENDY (SM), ABDEL-GALIL (H), SHAHIN (Y) and HEGAZI (FI). Acetoin and diacetyl formation by *Streptococcus lactis* subsp. *diacetylactis* DRC3. *J. Food Prot.* 46(7); 1983; 601-4, 609

MUSHROOM

- 2451 TSCHIERPE (HJ). Environmental factors and mushrooms strains. *Mushroom J.* 132; 1983; 417-30
- 2452 PRUTHI (JS), MANAN (JK), RAINA (BL) and TEOTIA (MS). Improvement in whiteness and extension of shelf-life of fresh and processed mushroom (*Agaricus bisporus* and *Volvariella volvacea*). *Indian Food Packer.* 38(2); 1984; 55-63
- Mushrooms (*Agaricus bisporus* and *Volvariella volvacea*) were blanched in water and steamed for 5 minutes and steeped in solutions of (i) salt (5%) (ii) potassium metabisulphite (250-500 p.p.m. SO₂), (iii) citric acid

(0.25-0.5%), (iv) acetic acid (0.1%), (v) ascorbic acid (0.1%) and (vi) immersed in 30 volume H_2O_2 for 30 minutes, followed by steeping in solution of 0.25% citric acid and 500 p.p.m. SO_2 . Longitudinal and cross slit mushrooms were dehydrated in a cross flow drier at 60 C to 7.0% moisture, after blanching and stored in 200 gauge polyethylene bags and in light friction-top tins at 18-35 C. Both varieties of mushrooms contained protein 37.6-42.5%, moisture 86.5-92.8%, sugars 0.62-1.04% and total ash 14.5-15.6%. Blanching in water was superior to steam to retain the colour of steeped and dried mushrooms. Protein content decreased from 37 to 27% in water blanched mushrooms and 37-34.3% in steam blanched mushrooms. Changes in moisture, crude protein, crude fibre, total sugar, glucose, fructose, ascorbic acid total ash, pH, SO_2 and acidity after blanching and after 7 days of preservation were noted. Loss of ascorbic acid was 20% within 5 days storage at room temperature. Water blanched mushrooms steeped in 5% citric acid and 500 p.p.m. SO_2 was the best treatment; Mushrooms could be steeped for 8-10 days without losing much flavour and texture with minimum microbial load. Whiteness of mushrooms could also be maintained by treatment with (vi). Indian style curry prepared from steeped mushroom maintained good texture, flavour and general appearance and is comparable to fresh mushroom curry. Slicing the mushrooms longitudinally reduced the dehydration time; the drying ratio of *A. bisporus* and *V. volvacea* was 10.8:1 and 10.2:1 respectively. Dehydrated mushrooms stored in friction-top tins maintained good colour and texture upto 9 months, whereas in polyethylene bags, the storage life was 5-6 months
KAR

- 2453 WOZNIAK (W), SOBKOWSKA (E) and KWIATKOWSKA (A). The effect of freezing on the sensory properties of *Xerocomus badius* (Fr. Kühn) and *Tricholoma equestre* (L ex Fr, Quel). *Nahrung*. 27(5); 1983; 469-78

As the result of sensory and gas chromatographic investigation of the edible mushrooms *Xerocomus badius* and *Tricholoma equestre* aroma properties, it was found that freezing preserves the general character of typical aroma. The observed changes were mostly favourable for intensifying sensory value characteristic for investigated species and, in the case of *T. equestre*, lowering the threshold concentration. AA

- 2454 KURKELA (R) and PAAKKONEN (K). Water sorption of Northern milk cap mushroom (*Lactarius trivialis*). *Food Sci. + Technol*. 17(5); 1983; 285-8

- 2455 WNUK (S), KINASTOWSKI (S) and KAMINSKI (E). Synthesis and analysis of 1-octen-3-ol, the main flavour component of mushrooms. *Nahrung*. 27(5); 1983; 479-86

A study was carried out on the possibility of obtaining 1-octen-3-ol synthetically. The synthesis of this compound was carried out by two methods, i.e. by Grignard reaction between acrolein and amyl iodide and by selective reduction of 1-octen-3-on. The purity of the 1-octen-3-ol obtained was determined by GLC and by spectroscopic methods. The compound obtained by Grignard reaction had its IR, ^{13}C NMR spectra and GLC chromatogram identical with those of the standard. The yield of 1-octen-3-ol by Grignard reaction was 65%, while the reduction of the ketone to the alcohol gave a yield of 90%. AA

- 2456 KAZANAS (N) and JACKSON (GJ). *Sporothrix schenckii* isolated from edible black fungus mushrooms. *J. Food Prot*. 46(8); 1983; 714-6

Sporothrix schenckii, a fungus which is pathogenic to humans, was recovered from imported desiccated black fungus mushrooms (*Auricularia polytrichia* (Mont.) Sacc.) usually used in preparing Far Eastern cuisine. Identification was based on microscopic and gross morphology, dimorphism at 25 and 37 C and reactivity with fluorescein-labeled antibodies specific for the yeast-cell form of the fungus. This is the first known report of *S. schenckii* in or on edible mushrooms. AA

YEAST

- 2457 BARBER (CB), BARBER (S) and GONZALEZ-CAUDELI (C). Influence of the wheat flour in the evaluation of the fermentation capacity of compressed bakers' yeast. *Rev. Agroquim. Tecnol. Aliment.* 23(3); 1983; 401

Four different wheat flours have been selected and used to determine the fermentation capacity of six commercial yeasts (five compressed and one dry). Results have shown that: a) The quantity of gas produced by each yeast when fermenting the same flour varies widely. b) The quantity of gas produced by a determined yeast also varies with the flour used. In general, the order of fermentation capacity of yeasts is maintained, those yeasts producing more gas with a flour do the same with others, and *vice versa* c) The coefficient of retention of gas is 100% for all the samples during the first 30 minutes, and ranges between 93.2 and 99.3% after 2 hours of fermentation, and between 73.3 and 90.2% after 3 hours. Both the yeast and the flour are sources of variation, but the influence of the first one is more important and d) The cost of the gas produced and retained also varies with the yeast and the flour used. AA

- 2458 CHANDER (H) and KLOSTERMEYER (H). Production of lipase by *Byssoschlamys fulva*. *J. Food Prot.* 46(8); 1983; 707-9

SINGLE CELL PROTEIN

- 2459 LITCHFIELD (JH). Single-cell proteins. *Science*. 219(4585); 1983; 740-46
Discusses: raw materials; sources and treatment; process characteristics; economics; product quality and safety; market considerations; and prospects. BSN
- 2460 PUJOL (F) and BAHAR (S). Production of single cell protein from green plantain skin. *European J. Appl. Microbiol. Biotechnol.* 18(6); 1983; 361-8
The skin of green plantain (*Musa paradisiaca*) was hydrolysed by acid or enzymatically using *Endomycopsis fibuliger* or a combination of both. The media were inoculated with *Pichia spartinae*. Higher biomass production were obtained with acid hydrolysis. The results obtained indicate that the skin of plantain could serve as a low cost substrate for the production of microbial proteins. KAR

FOOD ADDITIVES

ANTIOXIDANT

- 2461 NIEBERGALL (H) and HARTMANN (M). Determination and specific migration of antioxidants and plasticizers. *Food Sci. + Technol.* 17(5); 1983; 254-62 (German)

The antioxidants and plasticizers present in fats and oils were determined by direct injection into HPLC. This method permitted estimation of 0.5 ppm of di-2-ethylhexylphthalate (DEHP) in castor oil, 0.1 ppm of 2,6-ditert-butyl-4-methylphenol (BHT) in sunflower oil, and of 5 ppm of Ionox 330 and 50 ppm of Irganox 1076 in coconut fat. These substances can be estimated in the same way, when they are present in PVC. Migration of BHT out of PVC and PP foils into several spices was examined. About 95.5% of the additive was found to have migrated into cloves after 10 days of storage at 40 C. Migration values for BHT, Ionox 330, and Irganox 1076, from PVC or PP, into water, sunflower oil, and coconut fat have been determined. The dragging effect of plasticizers could also be demonstrated. KMD

- 2462 TAKAHASHI (O) and HIRAGA (K). Effects of dietary butylated hydroxytoluene on functional and biochemical properties of platelets and plasma preceding the occurrence of haemorrhage in rats. *Food Chem. Toxicol.* 22(2); 1984; 97-103

Measurements of platelet-particle concentration, platelet haematocrit and mean platelet volume showed no significant differences between control rats and rats given 1.2% butylated hydroxytoluene (BHT) in the diet for 1 week, but the platelet distribution width was significantly smaller in the rats fed BHT. By optical measurement, epinephrine-induced platelet aggregation was found to be significantly decreased in both the platelet-rich plasma and washed platelets of rats given BHT. Phosphatidylethanolamine in the platelet lipid was significantly increased by BHT treatment, while in the total lipid of the platelets, linoleic acid and eicosatrienoic acid were increased and arachidonic acid was decreased. The arachidonic/linoleic ratio was decreased by about 50% in the platelets of BHT-treated rats. BHT ingestion also changed the lipid composition, the concentration of lipid hydroperoxides and the zinc content of the plasma. The relationship of the observed effects to haemostatic function is discussed. AA

COLORANT

- 2463 BROUILLARD (R). The *in vivo* expression of anthocyanin colour in plants. *Phytochemistry.* 22(6); 1983; 1311-23

During the last two decades both model experiments and *in vivo* investigations have given a deeper insight into our understanding of the organization of anthocyanins in living tissues. The main factors known to affect the colour of anthocyanin containing media and the chemical nature of an anthocyanin, its concentration, the cooccurrence of several pigments, the pH and the presence of copigments. Under conditions as similar as possible to the conditions in nature, low concentrated aqueous solutions of the most common anthocyanins are characterized by the existence of several chemical equilibria: a fast acid and base catalysed prototropic tautomerism; a

hydration of the pyrylium ring and a ring-chain prototropic tautomerism leading to opening of the pyranol ring. In their natural states, anthocyanins must be protected against nucleophilic reagents, especially water which is the main constituent of the vacuole. Nucleophilic addition of water to the flavylium cation results in colour loss. Copigmentation is probably the most efficient means of protecting the flavylium cation against these compounds. Until now, the only suitable spectroscopic technique for anthocyanins *in vivo* studies was UV-visible absorption spectroscopy. Very recently, resonance Raman spectroscopy was successfully applied to both aqueous anthocyanin solutions and to living tissues containing these pigments. AA

- 2464 SHASHANK (VB) and DUBASH (PJ). Beet pigments as food colours. *Indian Food Packer*. 38(1); 1984; 67-71

Beet juice extracted from blanched beet roots (*Beta vulgaris*) and fermented with the yeast; *Candida utilis* for removal of sugars, was converted from (a) fermented or an unfermented juice into free flowing powders by first, either drying on a water bath or by vacuum-or-freeze drying, for ensuring maximum retention of colour. Final drying was accomplished in a vacuum shelf to obtain a free flowing powder. By using a flash evaporator, a beet-juice concentrate was prepared and its light stability studied. Colourant values of concentrate and powder were compared with amaranth dye. BSN

- 2465 HAYLIKOVÁ (L), MIKOVÁ (K) and KYZLINK (V). Heat stability of betacyanins. *Z. Lebensmittel-unters. Forsch.* 177(4); 1983; 247-50

- 2466 SAGUY (I), GOLDMAN (M), BORD (A) and COHEN (E). Effect of oxygen retained on beet powder on the stability of betanine and vulgaxanthine. *J. Food Sci.* 49(1); 1984; 99-101, 113

The effect of oxygen on the beet pigments was studied at 35 C as a function of a_w ("dry" - 0.75), moisture content, added aluminium oxide powder and headspace gases (N_2 , air). A low a_w (≤ 0.5) and a N environment significantly enhanced the stability. The reaction upto $a_w \sim 0.5$ was governed by the lack of liquid phase mobility. At a reaction of above 0.5 a_w , the concentration of oxygen governed the transition in the pigment deterioration mechanism. Al_2O_3 caused a fast pigment oxidation due to a catalytic reaction. MVG

- 2467 RITACCO (RP), RODRIGUEZ (DB), BRITTON (G), LEE (T-C), CHICHESTER (CO) and SIMPSON (KL). Investigations of carotenoid reactions on Micro-Cel C. *J. Agric. Food Chem.* 32(2); 1984; 296-300

Micro-Cel C is a common chromatographic adsorbent. Alpha carotene and β -apo-8'-carotenol underwent hydroxylation; retinol and β -ionone did not undergo hydroxylation. Lycopene reacted almost completely. By washing of Micro Cel C with acetone or methanol before mixing with α -carotene, hydroxylation was stopped. Used Micro cel C could be recycled after removing acetone from first extraction of pigments. JVS

- 2468 RITACCO (RP), BRITTON (G) and SIMPSON (KL). A proposed mechanism for the hydroxylation of carotenoids on Micro-Cel C. *J. Agric. Food Chem.* 32(2); 1984; 301-4

The optimum reactivity of β -apo-8'-carotenol occurred at water content of about 4%. Micro-Cel C lost about 7% of its weight in 24 hours at 130 C. The yield of 4-hydroxy- β -apo-8'-carotenol resulting from the reaction of β -apo-8'-carotenol with used and unused Micro Cel C was nearly equal, thereby indicating that Micro Cel C served as the catalytic support. β -carotene exposed to used Micro Cel C gave 54% yield, which was similar to that

obtained with unused Micro Cel C. Addition of methanol at 10% level to Micro Cel C gave the 4-methoxy derivative and the use of $H_2^{18}O$ also yielded 4-hydroxy derivative rich in oxygen-18. JVS

- 2469 ROSENBERG (M), MANNHEIM (CH) and KOPELMAN (IJ). Carotenoid base food colorant extracted from orange peel by d-limonene-extraction - Process and use. *Food Sci. + Technol.* 17(5); 1983; 270-75

Different methods were used to extract carotenoid pigments from orange peels by means of d-limonene. The most suitable process, was a two-stage (2 minute each) counter-current process, using a peel/solvent ratio of 1:2 in a blender. About 4.5 g of crude pigment concentrate was obtained from 1 kg of Valencia peels. The concentrated peel extracts did improve the colour of poorly coloured products, but they also caused an unpleasant flavour, which limited their use in citrus beverages. KMD

- 2470 HAGIWARA (A), SHIBATA (M), KURATA (Y), SEKI (K), FUKUSHIMA (S) and ITO (N). Long-term toxicity and carcinogenicity test of ammonia-process caramel colouring given to B6C3F₁ mice in the drinking-water. *Food Chem. Toxicol.* 21(6); 1983; 701-6

Caramel colouring (ammonia process) was given at levels of 0 (control), 1.25 and 5.0% in the drinking-water to groups of 50 male and 50 female mice for 96 weeks and then all the animals were maintained without caramel for a further 8 weeks. Males given 5.0% caramel showed increased cumulative mortality from week 100 to the end of the experiment. The white blood cell count in treated males was significantly elevated in a dose-related manner. However, these changes were not considered to be biologically significant. There were no treatment-related effects on clinical signs, body or organ weights, results of urine analyses or histological features. Therefore, this study did not demonstrate any carcinogenic effect of caramel on mice at levels of up to 5.0% in the drinking water. AA

FLAVOURING

- 2471 WILD (D), KING (M-T), GOCKE (E) and ECKHARDT (K). Study of artificial flavouring substances for mutagenicity in the Salmonella/microsome BASC and micronucleus tests. *Food Chem. Toxicol.* 21(6); 1983; 707-19

Seventy-six compounds used as artificial flavouring substances in food products were studied for mutagenic properties by the use of Salmonella/mammalian microsome test (Ames test), Basc test on *Drosophila melanogaster* and micronucleus test on mouse bone marrow. The following four compounds were mutagenic in Ames tests: ethyl nitrite, ethyl 3-phenylglycidate, 6-methylquinoline and musk ambrette. Of these, ethyl nitrite and musk ambrette also induced a significant ($P \leq 0.01$) increase in sex-linked recessive lethal mutations in *Drosophila*. Two further compounds, ethyl-3-methyl-3-phenylglycidate and 4-propylanisole, appeared weakly mutagenic in *Drosophila* only. The result with 4-propylanisole was judged to be of equivocal biological significance. None of the flavouring substances induced micronucleic i.e. cytogenetic damage in the bone marrow of mice. AA

- 2472 DANNEMAN (PJ), BOOMAN (KA), DORSKY (J), KOHRMAN (KA), ROTHENSTEIN (AS), SEDLAK (RI) and STELTENKAMP (RJ). Cinnamic aldehyde: A survey of consumer patch-test sensitization. *Food Chem. Toxicol.* 21(6); 1983; 721-5

The potential for cinnamic aldehyde, an important fragrance and flavour ingredient, to induce or to elicit delayed contact hypersensitivity reactions

in man was evaluated by analysing patch-test data. Results of studies involving a total of 4117 patch tests on various consumer products and fragrance blends containing cinnamic aldehyde and on the material itself were collected from fragrance and formulator companies. The data indicate that cinnamic aldehyde contained in consumer products and fragrance blends at concentrations up to $6 \times 10^{-1}\%$, and patch-tested at concentrations up to $8 \times 10^{-3}\%$, has no detectable potential to induce hypersensitivity. Results of the current survey show that when cinnamic aldehyde was tested alone or as part of a mixture in subjects in the general population, no pre-existing hypersensitivity reactions to the fragrance material were observed in any of the 4117 patch tests which constituted the survey. Cinnamic aldehyde at the concentrations contained in consumer products and fragrances, has a very low potential to induce hypersensitivity ('induced' reactions) or to elicit sensitization reactions ('elicited' reactions) in the general population. AA

- 2473 YAMAGUCHI (S) and TAKAHASHI (C). Interactions of monosodium glutamate and sodium chloride on saltiness and palatability of a clear soup. *J. Food Sci.* 49(1); 1984; 82-5

The sensory interactions of monosodium glutamate (MSG) and NaCl in a clear soup were examined by a sensory test, by a response-surface method. The extents of saltiness and palatability were expressed by second order polynomials of the concentrations of MSG and NaCl added. The polynomials indicated that to provide an appropriate saltiness and the maximum palatability score, more NaCl was required in soup with a lower MSG concentration, and vice versa. It is recommended that when the amount of sodium in the soup must be restricted while retaining a high palatability score, the NaCl level should be reduced while adding an optimal MSG level. AA

PRESERVATIVE

- 2474 PATEL (SV), BHADANI (GV) and JOSHI (GB). Preparation and antimicrobial activity of some substituted 4-thiazolidinones and their benzoyl derivatives. *J. Indian Chem. Soc.* 61(2); 1984; 169-171
- 2475 GERTZ (Chr) and HERRMANN (K). Determination of sorbic acid, benzoic acid and PHB esters in foodstuffs by means of HPLC. *Dtsch. Lebensmittel-Rundschau.* 79(10); 1983; 331-4 (German)
- A simple analytical method for the determination of sorbic acid, benzoic acid and methyl, ethyl and propyl p-hydroxybenzoates is described using high performance liquid chromatography. All relevant preservatives are extracted by a solvent mixture consisting of acetonitril, 2-propanol, ethanol and oxalic acid. 3-Hydroxy-benzoic acid is added as internal standard. After refrigerating and separating interfering materials by centrifugation the extract is analysed without any further clean-ups. The quantitative evaluation is performed by HPLC on a short column (60 mm) packed with Spherisorb ODS II, $3\mu\text{m}$ using methanol-water-phosphoric acid and tetrahydrofuran as eluent with UV absorbance detection at 230 nm and 254 nm. The recovery is 92% on average. The detection limits are for sorbic acid 0.5 mg/kg, benzoic acid 2 mg/kg and for the esters of p-hydroxybenzoic acid 10 mg/kg. AA
- 2476 RICO-MUNOZ (E) and DAVIDSON (PM). Effect of calcium and magnesium on the antibacterial activity of phenolic antioxidants against *Staphylococcus aureus* A 100. *J. Food Sci.* 49(1); 1984; 282-3

Butylated hydroxyanisole (BHA) at 150 ppm, and tertiary butylhydroquinone (TBHQ) at 100 ppm, were tested against *Staphylococcus aureus* A 100 in the presence of 50 and 100 mM Ca^{2+} or Mg^{2+} . The inhibitory activity of BHA was increased by the presence of Ca^{2+} but not Mg^{2+} in the suspending buffer. An increase in Ca^{2+} concentration did not cause additional increase in the activity of this compound. With TBHQ, there was no apparent increase in antibacterial activity by the presence of either Ca^{2+} or Mg^{2+} . AA

- 2477 VAAMONDE (G), CHIRIFE (J) and SCARMATO (G). Inhibition of *Staphylococcus aureus* growth in laboratory media of water activity adjusted with polyethylene glycols. *J. Food Sci.* 49(1); 1984; 296-7

It was shown earlier that polyethylene glycol (PEG-200 and PEG-400) had significant inhibitory effect on *S. aureus* ATCC 6538 P independent of lowering of water activity (a_w). The studies were extended to other strain (C-243 and S-6) of *S. aureus* for verifying the effects as well as to establish the lowest a_w required for inhibition. At or below 0.93 a_w , no growth of either 6538 P or S-6 occurred in either PEG-200 or PEG-400. Strain C-243, however, showed slow growth in PEG-400 at 0.93 a_w , but was inhibited at 0.92 a_w . At 0.96 a_w , all strains showed good growth in either PEG-200 or PEG-400. It was conducted that the bactericidal effect of PEG-200 and PEG-400 on *S. aureus* cannot be completely explained in terms of a_w lowering. MVG

- 2478 HUHTANEN (CN) and GUY (EJ). Antifungal properties of esters of alkenoic and alkynoic acids. *J. Food Sci.* 49(1); 1984; 281,283

The esters were studied by placing them in desiccators containing suspended bread. Several of them inhibited mould development at a concentration of 20 mg per 2.6 litre desiccator. MVG

- 2479 TSAI (W-YJ), SHAO (KPP) and BULLERMAN (LB). Effects of sorbate and propionate on growth and aflatoxin production of sublethally injured *Aspergillus parasiticus*. *J. Food Sci.* 49(1); 1984; 86-90, 93

Spores injured by heating at 55 C for 15 minutes or 50 Krad γ -irradiation were studied in presence of sorbate (0.05 and 0.1%) and propionate (0.2 and 0.4%) in YES borth at pH 4.5, 5.5 and 6.5. and 25 C for 21 days with γ -irradiation, aflatoxin production was accelerated in the early stages, but not in the heat treatment. Both inhibitors slowed growth of injured spores than non-injured, inhibition being dependent on inhibited concentration, pH and injury. MVG

STABILIZER

- 2480 MOHAMED (SB). An absolute calculation of the rigidity modulus of protein alginate gels using forging theory on instron data. *J. Texture Stud.* 14(4); 1983; 353-76

The paper describes a procedure and an equation to calculate the absolute rigidity modulus G of materials which undergo barrel shape deformation when compressed by an Instron. Values for G of gelatine-alginate and casein-alginate gels were determined over the pH range of 2.6-9.6. The rigidity modulus of these gels after freezing and thawing were then compared. The swelling behaviour of these gels at various pH values were also shown. AA

- 2481 FISHMAN (ML), PFEFFER (PE), BARFORD (RA) and DONER (LW). Studies on pectin solution properties by high-performance size exclusion chromatography. *J. Agric. Food Chem.* 32(2); 1984; 372-8
The polysaccharide pectin is a food fibre and a thickening agent used in processed foods. Pectin was found to exhibit complicated behaviour as shown by HPSEC with E-linear μ Boudagel columns. JVS
- 2482 WALTER (RH) and SHERMAN (RM). Flow profiles of aqueous dispersed pectins. *J. Food Sci.* 49(1); 1984; 67-9
The viscosity numbers of dilute, aqueous, pectin dispersions in 0.04 molal tartaric acid were measured as a function of pectin concentration. The flow characteristics were concluded to be pectin specific rather than class-specific. The equation describing the linear relationship involves a squared expression of the factors that influence the mass and size of the macromolecules. As a result, small differences in methoxyl content, polydispersity, location of carboxyl groups, etc. were exaggerated to give each pectin a nearly unique orientation in a coordinate plane, defined by an apparent-viscosity factor and the reciprocal, absolute temperature. AA
- 2483 DAHME (A). On the measurement of the rigidity of weak pectin gels. *Nahrung.* 27(7); 1983; K21-K22 (German)
- 2484 MILLS (PL) and KOKINI (JL). Comparison of steady shear and dynamic viscoelastic properties of guar and karaya gums. *J. Food Sci.* 49(1); 1984; 1-4, 9
- 2485 BOGRACEVA (TJ), GRINBERG (WJ) and TOLSTOGUZOV (VB). On the compatability of acacia gum with macromolecular components of the globulin fraction of baker's yeast. *Nahrung.* 27(8); 1983; 735-40 (German)
In an aqueous medium, all the components of the globulin fraction of baker's yeast (lipid-protein complexes, proteins, protein-nucleic acid complexes) are in some measure compatible. For a given concentration of the polysaccharide, the compatibility decreases in the order nucleic acid-protein complexes > proteins > lipid-protein complexes. NaCl does not affect the compatibility of solubilized lipids with acacia gum; however, it considerably reduces the compatibility of nucleic acid-protein complexes, and especially of proteins, with this polysaccharide. As regards the separation of the solubilized lipids from the main protein components of the globulin fraction of baker's yeast by fractional precipitation using acacia gum, the authors recommend to perform it at a low salt content. In this way, the losses of main protein components which result from the coprecipitation are considerably reduced. AA
- 2486 BOKHARY (HA), HASSIB (AM) and SULEIMAN (AAA). Gamma irradiation effects on carbohydrate composition, growth of microorganisms and ESR spectra of gum arabic (*Acacia senegal* L.). *J. Food Prot.* 46(7); 1983; 585-8

SWEETENER

- 2487 HIGGINBOTHAM (JD), SNODIN (DJ), EATON (KK) and DANIEL (JW). Safety evaluation of thaumatin (talin protein). *Food Chem. Toxicol.* 21(6); 1983; 815-23
Thaumatococcus daniellii (Benth.) has been studied for its subacute toxicity in rats and dogs and its ability to produce anaphylactic antibodies following oral

administration to rats and normal human subjects. Thaumatin, was readily digested prior to absorption in rats and no adverse effects resulted from its continuous administration to rats and dogs at dietary concentrations of 0, 0.3, 1.0 and 3.0% for 13 weeks. The results indicate that thaumatin when used as a flavour modifier and extender, and partial sweetener, is unlikely to be hazardous at the anticipated level of consumption. AA

2488 McCORMICK (RD). Synthetic sweeteners - though choice limited by regulatory actions, the need remains. *Process. Prepared Food*. 152(6); 1983; 111-2, 115

2489 GOFF (DH) and JORDAN (WK). Aspartame and polydextrose in a calorie-reduced frozen dairy dessert. *J. Food Sci.* 49(1); 1984; 306-7

A calorie-reduced frozen dairy dessert was formulated using aspartame as the sweetener and polydextrose as the bulking agent. Two levels each of polydextrose/corn syrup solids combinations and microcrystalline cellulose were evaluated in a dessert consisting of 4% milkfat and 30.5% total solids. Taste panel data showed that the products were acceptable and that microcrystalline cellulose played an important role in the formula. Four levels of polydextrose sorbitol combinations and two levels of aspartame were also evaluated in a 2% fat, 29.8% total solids frozen dessert. The taste panel data showed that usage levels between 0.05-0.1% aspartame and a maximum of 12% polydextrose produced an acceptable product. AA

CEREALS

2490 ANON. Report on the 11th Cereal Convention. *Dtsch. Lebensmittel-Rundschau*. 79(9); 1983; 306-8 (German)

Summaries of the following 11 papers have been presented: POMMER (G) - Alternative agriculture, GANSSMANN (W) - Quality data on oats, based on investigations into last year's harvest, and quality criteria for industrial processing. HENNING (K) - Quality conscious production of baking wheats. BAUMER (M) and FRITZ (A) - Attempt to estimate the energy value (as fodder) of winter barley. ISERMANN (K) and STURM (H) - Quality conscious production of wheat, keeping in view the cost of nitrogenous fertilizers. SVENSSON (G) - Milling capacity of wheat, as a function of variety and environment. MUNZING (K) - Possibilities and limits of the new method of grain drying. GUNZEL (G) - Behaviour of A-wheat-mixes and consequences for quality evaluation. WETZEL (G) - Results of multi-factorial tests with indigenous varieties of winter rye. WIEPERT (D) - Evaluation of the processing value of rye. BUNNIES (H) - Rye - plant with a future? KMD

2491 SCHMIDT (E), PIETZSCH (W), LOETTEL (W) and KROG (W). Modelling the mashing process of cereal grains. *Lebensmittel-industrie*. 30(5); 1983; 215-6 (German)

Scientific aspects of the transport and distribution of water within a cereal grain have been explained in some detail. Thereafter, a mathematical model of the mashing process has been evolved. KMD

2492 WIESER (H), SEILMEIER (W), EGGERT (M) and BELITZ (H-D). Tryptophan content of protein fractions from different cereals. *Z. Lebensmittel-unters Forsch.* 177(6); 1983; 457-60 (German)

The tryptophan contents of the albumin, globulin, prolamine and glutelin fractions from wheat, rye, barley, oat, sorghum, rice and maize were estimated

by HPLC after alkaline hydrolysis. Complete amino acid compositions, including the amide contents, are given for all these protein fractions. AA

- 2493 KIRSTEN (WJ), TERNRUD (JE) and HESSELIUS (GW). Automatic simultaneous determination of nitrogen and moisture in grain with or without weighing. *J. Agric. Food Chem.* 32(2); 1984; 279-84

The theoretical basis was provided by the observation that the flours of different strains of an grain species had more or less the same carbon and hydrogen. The possibility of analysing carbon, hydrogen, nitrogen and sulphur was indicated, so that the carbon figure obtained could be used as an internal standard to calculate nitrogen, sulphur and moisture contents from the ratios N/C, S/C and H/C as suggested by the working group for the analysis of nutrition, protein. Procedures for the simultaneous determination of nitrogen and moisture are described. JVS

- 2494 SCHINDLER (E). Combined procedure for the determination of lead, cadmium, and copper in cereals and in flour. *Dtsch. Lebensmittel-Rundschau*. 79(10); 1983; 334-7 (German)

By a graduation of the incineration vessels used for the combined, automatic estimation of Pb, Cu and Cd in cereals or in flour, a number of steps could be eliminated. A number of sources of error could be eliminated thereby, and a greater number of samples could be analyzed. KMD

- 2495 PRZYBYLSKI (B) and KAMINSKI (E). Thermal degradation of precursors and formation of flavour compounds during heating of cereal products. Part II. The formation and changes of volatile flavour compounds in thermally treated malt extracts at different temperature and pH. *Nahrung*. 27(5); 1983; 487-96

Alkaline pH of the medium was found to promote the formation of the compounds yielding a caramel odour. The most desirable organoleptic characteristics were obtained at pH 4.0-5.5 and temperature 140 C. Thirty compounds typical for nonenzymatic browning were identified. AA

RICE

- 2496 ZHANG (T-Y), BAKSHI (AS), GUSTAFSON (RJ) and LUND (DB). Finite element analysis of nonlinear water diffusion during rice soaking. *J. Food Sci.* 49(1); 1984; 246-50, 277

The formulation of a finite element model is described that could be used to analyze water diffusion during rice soaking with concentration dependent diffusivity and change in the size of rice. The rice is divided into 135 elements and moisture distribution with time is calculated. Knowing the moisture absorbed by each element, the nodal displacements are obtained by minimizing the potential energy of the system. Average mass diffusivity of milled rice decreased from 6.4×10^{-7} to 3.0×10^{-7} m²/hour as the moisture content increased from 13 to 50%. The density and concentration dependent mass diffusivity model adequately described experimental data. AA

- 2497 JAMES (C) and SLOAN (S). Functional properties of edible rice bran in model systems. *J. Food Sci.* 49(1); 1984; 310-11

Functional properties of rice bran model systems were systematically studied to evaluate their potential food use. Three stabilized rice bran products, two defatted and one full-fat, were investigated and compared to

wheat bran. Of the four brans investigated, the defatted extruded rice bran absorbed the most water and fat and had the greatest foaming capacity and stability. The defatted X-M processed rice bran exhibited functional behaviour most similar to that of wheat bran. The full-fat extruded rice bran absorbed the least amount of water and fat and did not form a foam. AA

- 2498 AZEEMODDIN (G) and THIRUMALA RAO (SD). Development of indigenous rice bran stabilizers. *Chem. Age India*. 35(2); 1984; 101-5

Cryogenic, thermal and chemical methods of stabilizing rice bran and devices therefore developed in India are described in the paper. AA

WHEAT

- 2499 GUNZEL (G). Effects of mixtures of quality wheat and consequences for their quality evaluation. *Getreide Mehl Brot*. 37(9); 1983; 265-8

- 2500 WASSERMANN (L), MUHLBAUER (W) and SCHREIBER (H). Influence of drying on wheat quality. Part 3. Influence of moisture content of the kernels on drying and baking behaviour. *Getreide Mehl Brot*. 37(9); 1983; 268-74 (German)

Drying experiments with hot air (6-80 C) were conducted on wheats having initial moisture contents between 15.5 and 28.0%. The germination capacity, moist gluten content, and baking volume were adversely affected when the air temperature exceeded the critical values - lying between 70 and 78 C - for any given moisture content. When drying is done at a temperature below 70 C no harm is done to the germinating of baking properties of the wheat grains. The above results are not applicable straightaway to wheats having moisture contents in the range 22 to 28%. KMD

- 2501 TSCHIMIROV (JI), SCHWENKE (KD), AUGUSTAT (D) and TOLSTOGUZOV (VB). Functional properties of plant proteins. Part 5. Influence of a partial enzymatic hydrolysis on selected functional properties of wheat gluten. *Nahrung*. 27(7); 1983; 659-68 (German)

The functional properties of wheat gluten are changed by a partial enzymatic hydrolysis. The solubility in the isoelectric range, the oil adsorption, and the emulsifying capacity increase but the water absorption capacity decreases, when 5-12% of the peptide bonds of the protein are ruptured by action of thermitase. The emulsifying capacity increases by a factor of 1.5-2.4 under these conditions. A complete loss of emulsifying activity and emulsion stability takes place when more than 10% of the peptide bonds split. While the foam capacity does not change remarkably, the foam stability decreases owing to the enzymatic hydrolysis. The foam stability of the unmodified protein increases by a short-time heating to 80 C, while the presence of sodium chloride, sodium sulphite or β -mercaptoethanol decreases the foam stability. AA

- 2502 MOSS (HJ) and MISKELLY (DM). Variation in starch quality in Australian flour. *Food Technol. Aust.* 36(2); 1984; 90-91

The distribution according to size of starch granules was found to be governed by an interaction between the effects of variety and environment of growth of the wheat plant, while starch Paste viscosity was controlled by the separate effects of variety and environment. AA

- 2503 GECAN (JS) and ATKINSON (JC). Microanalytical quality of wheat flour. *J. Food Prot.* 46(7); 1983; 582-4

Employing the AOAC method for estimation of tight filth in wheat flour samples (USDA quality check program survey); data obtained were insect fragments counts from 0-721 (mean 12.2); rodent hair fragments, 0-75; feather burbules, 0-3; insect heads, 0-2; mites, 0-2; insect larvae, 0-3; and psocids 0-1. BSN

- 2504 SA SOUZA (Ede), BALSEIRO (CA) and SEIBEL (W). Effect of additives in Argentine wheat flours. *Getreide Mehl Brot.* 37(9); 1983; 274-6 (German)

The effects of enzymatic and oxidative treatments to three commercial wheat flours (Type 630) from Argentina have been studied. The protein content of the flours ranged between 12.4 and 14.7%. The flour having a low protein content produced a very short dough. Argentine flours have a low enzyme content, and, therefore, can be distinctly improved by the action of malted flours and cysteine hydrochloride, in combination with oxidizing agents. Sometimes the flours show a low tolerance to oxidizing agents in the form of ascorbic acid and potassium bromate. KMD

OAT

- 2505 GANSSMANN (W). Quality data of oats harvested in recent years and quality criteria for industrial processing. *Getreide Mehl Brot.* 37(10); 1983; 298-302 (German)

Trials carried out in recent years on various oat varieties grown in West Germany have shown that these varieties are well suited for the industrial production and marketing of various types of oat products for human consumption. KMD

RYE

- 2506 BUNNIES (H). Rye - A grain with a future? *Getreide Mehl Brot.* 37(10); 1983; 295-8 (German)

Recent progress in the cultivation of improved varieties of rye indicates that the decline in consumption of rye bread can be halted, and that consumption of rye may well increase, as its advantages become more and more apparent. KMD

- 2507 WETZEL (M). Results of variety tests with winter rye. *Getreide Mehl Brot.* 37(9); 1983; 262-5 (German)

MILLETS

FOXTAIL MILLET

- 2508 TAIRA (H). Lipid content and fatty acid composition of nonglutinous and glutinous varieties of foxtail millet. *J. Agric. Food Chem.* 32(2); 1984; 369-71

The dominant fatty acid was linoleic acid (about 70% total solids).

The glutinous variety was characterised by higher lipid and palmitic acid contents as compared to non-glutinous types. JVS

PEARL MILLET

- 2509 DAHIYA (S) and KAPOOR (AC). Effect of storage conditions on the protein quality of pearl millet flour. *Nutr. Rep. Int.* 28(6); 1983; 1351-9
- Whole gram flours of two high yielding varieties (HC 6 and HC 7) of pearl millet (*Pennisetum typhoides* Rich) were stored in polythene bag, earthen pot and gunny bag for two different periods (10 and 20 days) at prevailing room temperature (20-27 C) with relative humidity 60-70%. During storage, moisture content increased, whereas total protein did not change. The prolamines and glutamines were the major proteins of pearl millet constituting 63% of total protein. The different protein fractions were not affected by storage conditions. The amounts of tryptophan, methionine, total and available lysine decreased in storage. The values of chemical score, protein quality index and biological parameters of protein quality also reduced. The maximum decrease in protein quality was found in variety HC 6 stored in gunny bag. AA
- 2510 KLOPFENSTEIN (CF), HOSENEY (RC) and LEIPOLD (HW). Further studies on the goitrogenic effects of pearl millet diets. *Nutr. Rep. Int.* 28(5); 1983; 1137-44
- Rats fed pearl millet diets found to develop symptoms similar to those of colloid goiter in humans. Autoclaving the grain appears to alleviate the symptoms, but iodine supplementation does not. KAR

SORGHUM

- 2511 CAGAMPANG (GB), KIRLEIS (AW) and MARKS (JS). Application of small sample back extrusion test for measuring texture of cooked sorghum grain. *J. Food Sci.* 49(1); 1984; 278-81, 283
- The test mounted in an Instron Universal testing machine was used with both cooked whole and decorticated grains. The results showed that it could be considered as a sensitive direct measure of texture of boiled sorghum. Its advantages were (i) requirement of small amount of sample; (ii) its test cell is inexpensive and easily cleaned; and (iii) simplicity of sample preparation as decorticated grain could be used. It has a high potential as a selection index in the breeding programme. MVG
- 2512 SUBRAMANIAN (V), JAMBUNATHAN (R) and SEETHARAMA (N). Biochemical changes during seed development in sorghum (*Sorghum bicolor*). *Phytochemistry.* 22(5); 1983; 1097-1101

MAIZE

- 2513 SAUREZ (C), LONCIN (M) and CHIRIFE (J). A preliminary study on the effect of ethyl oleate dipping treatment on drying rate of grain corn. *J. Food Sci.* 49(1); 1984; 236-8
- Sweet corn and immature field corn kernels were air-dried in controlled and measured conditions without treatment or after dipping for 30 seconds in a cold aqueous suspension of 1% ethyl oleate. Dipping in ethyl oleate

resulted in most cases in a great increase in the drying rate of kernels. This is attributed to the action of ethyl oleate on the waxy cuticle of corn kernel which results in reduced cuticular resistance to water loss. AA

- 2514 SINGH (T) and BAINS (GS). Malting of corn: effect of variety, germination, gibberellic acid and alkali pretreatments. *J. Agric. Food Chem.* 32(2); 1984; 346-8

White and yellow corn varieties, MS1 and Vijay, steeped to 40% moisture were germinated at 25 C for 3, 5, and 7 days with and without alkali pretreatments and gibberellic acid (GA). The yield of malt was satisfactory but for low diastatic power. α -Amylase activity was considerably increased by pretreatment with GA and longer germination. The Kolbach index of 7 days germinated white variety malt was higher and its wort perceptibly more yellow than that of the yellow variety. The presence of a starch fraction in the mash resistant to α -amylase action has been noted. AA

- 2515 DICKINSON (DB), BOYER (CD) and VELU (JG). Reserve carbohydrates from kernels of sugary and sugary enhancer maize. *Phytochemistry*. 22(6); 1983; 1371-3

Mature seeds of 'sugary' (*su*) and 'sugary-sugary enhancer' (*su-se*) maize inbreds were compared with respect to amount and properties of starch and glycogen. Sucrose and maltose were elevated in the *su-se* seeds, starch was reduced and phytoglycogen was within the range expected for an *su* line. The *se* trait did not result in altered sucrose of the starch or phytoglycogen. Hence, it is unlikely that the observed increase in maltose resulted from premature action of amylase on starch and phytoglycogen during seed maturation. AA

- 2516 EL-SHAFEI (MM), ABBASSI (MH), BASSILY (NS) and SAID (AK). Availability of essential amino acids in corn flour and corn bread. *Nahrung*. 27(8); 1983; 803-8

The availability of nitrogen, lysine and 9 essential amino acids was determined in corn before and after baking. Lysine availability was determined by the growth response method on weaning rats using regression analysis of body weight gain or moisture gain against lysine consumed from corn flour and corn bread. The results show a high correlation between lysine consumed and weight gain or moisture gain ($r = 0.95$) for rats fed the standard diets for 3 weeks. A good correlation was also obtained for corn bread. The results of lysine availability show that baking greatly improves availability by both ways of calculation. The availability of nitrogen and essential amino acids were also investigated by the balance trials with rats. Results show that availability values for nitrogen and all amino acids except threonine increased by baking. Data for food intake, weight gain, food efficiency, PER, NPR and true digestibility revealed that baking had little or no effect on nutritive value of corn tested in this investigation. AA

- 2517 CHRISTIANSON (DD), FRIEDRICH (JP), LIST (GR), WARNER (K), BAGLEY (EB), STRINGFELLOW (AC) and INGLETT (GE). Supercritical fluid extraction of dry-milled corn germ with carbon dioxide. *J. Food Sci.* 49(1); 1984; 229-32, 272

The extraction was done with supercritical carbon dioxide ($SC-CO_2$) at 5000-8000 psi and 50 C. Oil extracted had lower free fatty acids and refining loss; it had lighter colour as compared to a commercial expeller-milled crude oil. Both types of oil had similar total unsaponifiable and tocopherol contents. The defatted flour which was highly friable had moisture of 2-5%

and good flavour. It contained 20% protein with good amino acid balance. It was found that high pressure SC-CO₂ extraction also denatured the proteins including oxidative enzymes; peroxidase activity was reduced 10 fold in SC-CO₂ extracted flour as compared to hexane-extracted flour. Storage of flour for 5 weeks at 8 C and 2 months at 25 C did not affect flavour quality of untoasted SC-CO₂-defatted germ flour even under extreme conditions. MVG

- 2518 KULAKOVA (EV), VAINERMAN (ES) and ROGOZHIN (SV). Contribution to the investigation of the corn germ, part II. Chemical composition of germ meal out of corn-oil cake. *Nahrung*. 27(8); 1983; 721-6

The germ meal out of corn-oil cake contained up to 24.3% of protein, on the average. The main part of germ meal proteins was represented by the alkali-soluble fraction, up to 79.9%; the water-soluble proteins made up 7.3%, the salt-soluble - up to 4.6%, and alcohol-soluble - only up to 1%. With regard to the biological value, determined by fermentation hydrolysis, the total germ meal protein and its basic alkali-soluble fraction were not inferior to egg albumin and casein. The biological value of the test proteins, calculated by the amino acid score, is nearing the biological value of an intact hen's egg and human milk. The alkali-soluble fraction of germ meal protein has a high foam-forming ability and foam stability. AA

PULSES

- 2519 OLOGHOBO (AD) and FETUGA (BL). Distribution of phosphorus and phytate in some Nigerian varieties of legumes and some effects of processing. *J. Food Sci.* 49(1); 1984; 199-201

Phytate anion, total phosphorus (P), phytate-P, inorganic and residual P contents were determined in different varieties of cowpeas, lima beans and soyabeans. The dry seeds were subjected to different processing methods which included cooking, autoclaving, soaking and germination. Germination and soaking were most effective in decreasing phytate contents while cooking and autoclaving only slightly altered total P, phytate and phytate-P contents in all varieties. Germination increased inorganic P contents but effected the highest percentage loss in residual organic P. Soyabean contained considerable amounts of phytate anion and despite the reduction through processing, phytate content still exceeded the amount present in all varieties of raw lima beans. AA

ADZUKI BEAN

- 2520 CHEN (THH), GUSTA (LV), TIAHJADI (C) and BREENE (WM). Electrophoretic characterisation of Aduzki bean (*Vigna angularis*) seed proteins. *J. Agric. Food Chem.* 32(2); 1984; 396-399

The two dimensional SDS-PAGE electrophoretogram of total seed proteins indicated 40 well separated polypeptide spots. Two glycoproteins corresponding to (α and β) subunits of 7S globulin were revealed by periodic acid-Schiff staining. These sub units had relative mass of 55000 and 35000 respectively. JVS

BAMBARA PEA

- 2521 MARTINO-FERRER (MD) and FERRER (A). Trypsin inhibitor from bambara pea. *Phytochemistry*. 22(4); 1983; 813-6

BROAD BEAN

- 2522 ZIENA (HM), EL-TABEY SHEHATA (AM) and YOUSSEF (MM). The effect of pod and seed positions on the physical and cooking properties of faba beans (*Vicia faba*). *J. Sci. Food Agric.* 35(2); 1984; 207-11
The weight and volume of seeds were significantly affected by the location of pods and position of seeds. The seed coat percentage was highest in seeds from upper pods. The weight, volume, pH, and soluble/insoluble solids of stewed liquor were also significantly affected by pod location. The hydration coefficient of stewed beans was significantly affected by pod location. JVS
- 2523 HEGAZY (MJ) and MARQUARDT (RR). Metabolism of vicine and convicine in rat tissues: Absorption and excretion patterns and sites of hydrolysis. *J. Sci. Food Agric.* 35(2); 1984; 139-46
Vicine and convicine are components of *Vicia faba* beans. The present studies have suggested that these two compounds are absorbed by the rat in restricted amounts only; they are not hydrolysed by rat tissues and are rapidly cleared from tissue via the kidney. Most of the vicine and convicine were found to be hydrolysed in large intestines and caecum. JVS

CHICK PEA

- 2524 HANDA (G), SINGH (J), NANDI (LN) and ATAL (CK). A free purine nucleotide from *Cicer arietinum*. *Phytochemistry*. 22(6); 1983; 1499-1500
Theophylline-9- β -D-glucopyranosyl-6-monophosphate has been isolated and characterized for the first time from a natural source by spectroscopic and chemical methods. AA
- 2525 EL FAKI (HA), DESIKACHAR (HSR), TAREEN (JAK) and THARANATHAN (RN). Scanning electron microscopy of *in vivo* and *in vitro* digested starch granules of chick pea, cow pea, and horse gram. *Food Sci. + Technol.* 17(5); 1983; 276-81
Corn starch was more easily digested by rats than the granular starches isolated from chick peas, cow peas and the horse gram. The starches behaved differently when digested either *in vivo* or *in vitro* (by glucoamylase and salivary α -amylase). The starch granules of the chick pea appeared to be more easily digestible than the starch granules of the other two grain legumes. KMD

FRENCH BEAN

- 2526 APOSTOLATOS (G). Protein isolates rich in methionine from the edible dry bean (*Phaseolus vulgaris* L.). *J. Food Technol.* 19(2); 1984; 233-7
Several extraction and fractionation schemes were investigated for their ability to fractionate edible dry bean seed proteins into classes of variable methionine content. Isoelectric precipitation or dialysis from a protein

solution of low ionic strength resulted in protein isolates having methionine content equal to or lower than the average seed methionine. A protein isolate rich in methionine was obtained by the adjustment of a high ionic strength protein solution at pH 4.1. This methodology excluded the major storage seed proteins, which are known for their low methionine content. AA

MUNG BEAN

- 2527 KAMALAKANNAN (V), SATHYAMOORTHY (V) and MOTLAG (DB). Purification, characterisation and kinetics of a trypsin inhibitor from black gram (*Vigna mungo*). *J. Sci. Food Agric.* 35(2); 1984; 199-206

A black gram (*Vigna mungo*) trypsin inhibitor (BGTI) was purified to homogeneity by ammonium sulphate precipitation, DEAE-cellulose chromatography and affinity chromatography. The homogeneity of the inhibitor was identified by polyacrylamide gel electrophoresis (PAGE), SDS-PAGE, immunodiffusion and immunoelectrophoresis. The isoelectric point of BGTI was 8.32. The molecular weight of the BGTI was found to be about 12500 by both gel filtration and SDS-PAGE. One mole of the BGTI was found to contain 75 amino acid residues, and it was identified as a glycoprotein, comprising about 18.2% carbohydrate. The BGTI was an uncompetitive inhibitor, stable in the pH range 2-10 and in the temperature range 30-80 C for 30 minutes. AA

PEAS

- 2528 SCHROEDER (HE). Major albumins of *Pisum* cotyledons. *J. Sci. Food Agric.* 35(2); 1984; 191-8

The *Pisum* seed albumin fractions consist of two polypeptides constituting about 34% of albumin of protein fraction. Both these polypeptides (M_r 8000 and 22,000) are cotyledon specific. Tracer studies indicated that they are rich in sulphur containing amino acids. The levels of both these polypeptides were found to reduce under sulphur deficiency conditions. The μ_r 8000 polypeptide broke down during germination and seedling growth while μ_r 2000 polypeptide degraded relatively slowly. JVS

- 2529 MEREDITH (FI), LANGDALE (GW) and DULL (GG). Effect of ammonium nitrate and low-level foliar treatments of simazine on some chemical components and protein quality of 'pinkeyepurple hull' pea seeds. *J. Food Sci.* 49(1); 1984; 221-4

The above foliar treatments did not result in any differences in yield, crude fat and crude fiber though ash, protein and several amino acids increased with N. fertiliser treatments (30 and 60 kg/ha). Simazine treatment did not show any effect on essential amino acid content. In pods, the protein quality decreased with N fertiliser, simazine or a combination of both. MVG

WINGED BEAN

- 2530 KUTE (LS), KADAM (SS) and SALUNKHE (DK). Changes in sugars, starch and trypsin inhibitor activity in winged bean (*Psophocarpus tetragonolobus* L. DC) during seed development. *J. Food Sci.* 49(1); 1984; 314-5

Three cultivars of winged bean were analyzed for starch, sugars and trypsin inhibitor activity at different stages of seed maturity. The starch

content ranged from 5.66-6.22% whereas sugar content varied from 4.40-6.53% in the matured seeds. The starch content increased as the seed maturation progressed from stage I (40 days after flowering) to stage II (50 days after flowering) followed by a decrease up to complete maturity. The total sugar content increased up to stage III (60 days after flowering) of maturity followed by a decrease during subsequent stages of maturation. The trypsin inhibitor activity increased as the seed maturation advanced from stage I to complete maturity. AA

OILSEEDS AND NUTS

- 2531 KOZLOWSKA (H), ZADERNOWSKI (R) and SOSULSKI (FW). Phenolic acids in oil-seed flours. *Nahrung*. 27(5); 1983; 449-53

Noticeable quantitative differences were found in the content of free and bound phenolic acids in flours obtained from soyabeans, cottonseed, peanuts, rapeseed, white mustard, flax and sesame seeds. Independent of the type of seeds used to produce flour, the highest amounts of acids were liberated from ester bonds. These acids were especially abundant in flour made from rape and white mustard seeds. Phenolic compounds identified in these flours were predominated by sinapic and p-hydroxybenzoic acids and in the other flours by other phenolic acids. AA

RAPESEED

- 2532 DAUN (JK), MAZUR (PB) and MAREK (CJ). Use of gas-liquid chromatography for monitoring the fatty acid composition of Canadian rapeseed. *J. Am. Oil Chem. Soc.* 60(10); 1983; 1751-4

A combined extraction and methylation procedure has been used since 1972 for the gas-liquid chromatographic analysis of the fatty acid composition of up to 20,000 samples of rapeseed oil per year. Methyl esters can be analyzed in 5 minutes by this procedure. In the system presently used, the methyl esters are analyzed on a mixed-phase column which gives good resolution of the major fatty acids. Fifty samples can be analyzed in a day with the help of a microcomputer-controlled autosampler. The analysis reports contain, in addition to the complete fatty acid composition, estimates of iodine value and saponification value also. KMD

- 2533 MIETH (G), SCHWENKE (K-D), RAAB (B) and BRUCKNER (J). Rapeseed: Constituents and protein products. Part 1. Composition and properties of proteins and glucosinolates. *Nahrung*. 27(7); 1983; 675-97

- 2534 MIETH (G), BRUCKNER (J), KROLL (J) and POHL (J). Rapeseed: Constituents and protein products. Part 2. Preparation and properties of protein-enriched products. *Nahrung*. 27(8); 1983; 759-801

The literature is reviewed about the preparation and functional properties and application of defatted meals, protein concentrates and isolates of Brassica seeds. Especially, the influence of physico-chemical, microbiological and enzymatical treatments is represented on antinutritional compounds, glucosinolates, their splitting products and phytic acid. AA

SOYABEAN

- 2535 BIANCHI (MdeLP), SILVA (HC) and BRAGA (GL). Oligosaccharide content of ten varieties of dark-coated cotyledons. *J. Agric. Food Chem.* 32(2); 1984; 355-7

The oligosaccharides (extraction with 80% ethanol and determination by TLC) of black or brown soyabeans were found to consist of 3.88% sucrose, 0.79% raffinose and 3.37% stachyose on dry weight basis. The proportion of these sugars was 5:1:4 in black and brown seeds and 4.5:1:4 in yellow varieties. Raffinose+stachyose constituted 15.84% of carbohydrates in dark coated seeds and 16.32% in yellow coated seeds. JVS

- 2536 AOKI (H), SHIIASE (Y), KATO (J) and WATANABE (Y). Emulsion stabilizing properties of soy protein isolates mixed with sodium caseinates. *J. Food Sci.* 49(1); 1984; 212-6

Functional properties of soy protein isolates (SPI) were studied in complex systems where interactions with other components like proteins, fats and carbohydrates might occur. On mixing with sodium caseinate (SC), the emulsifying properties decreased from a high level of 77%, to as low levels of 15% (same as that of SC) in emulsions prepared using shearing force method. This was attributed to the initial coating of oil globules with a thin layer of SC which prevented adsorption of SPI. MVG

- 2537 NAKAMURA (T), UTSUMI (S) and MORI (T). Network structure formation in thermally induced gelation of glycinin. *J. Agric. Food Chem.* 32(2); 1984; 349-352

The 11S globulin referred to as glucinin is a major component of soybean protein. On heating (at 100 C) of this fraction, soluble aggregates with molecular weight of 1.8×10^6 , 4×10^6 and 8×10^6 are formed in 15 seconds, 30 seconds and 1 minute respectively. These soluble aggregates as well as heat induced gel have been studied by electron microscopy. The sequence of network structure formation during thermal gelation of glycinin has been described. JVS

- 2538 EDBERG (U). Vegetable proteins, especially soy proteins in food. *Var Foda.* 35(8); 1983; 345-56 (Swedish)

- 2539 VALENCIA (ME), DEL RIO (MD) and GONZALEZ (R). Feasibility of using soybean products in cream soup formulations: Functional and organoleptic evaluation. *Food Sci + Technol.* 16(6); 1983; 309-12

- 2540 HAGER (DF). Effects of extrusion upon soy concentrate solubility. *J. Agric. Food Chem.* 32(2); 1984; 293-6

Thermoplastic extrusion is employed to induce structure and texture to soya meal or concentrate for preparing meat analogues. Intermolecular disulphide bonding was found to be an important factor contributing to soy extrudate at least for low-temperature (about 150 C). There was no significant evidence for intermolecular peptide bond formation. JVS

- 2541 JOHNSON (LD) and WILSON (LA). Influence of soybean variety and the method of processing in tofu manufacturing: Comparison of methods for measuring soluble solids in soymilk. *J. Food Sci.* 49(1); 1984; 202-4

Three methods (light scattering, refractive index and hydrometry) for percent solids in soymilk (from varieties vinton, Amsoy 71 and Weber) were

compared. The soymilk was prepared by grinding hydrated soyabeans in (i) 20-25 C water (ii) 100 C water and holding the slurry temperature above 90 C for 10 minutes, or (iii) soaking at 45 C in 15% ethanol for 12 hours and grinding in 20-25 C water. At 80-90 C, hydrometer readings revealed no correlation in percent solids between the soy milk prepared by the above methods. Light scattering was found more accurate than refractive method. Variety and processing conditions induced significant differences between standard curves of percent solids versus light scattering. MVG

- 2542 BACKER (Gde), ROSSENEU (N) and PANNIER (R). Influence of soy milk on serum lipids and apoprotein. *Voeding*. 44(9); 1983; 304-8 (Norwegian)

After 4 weeks on a diet containing 500 ml of soy milk, a significant decrease of 19% was observed in the HDL-chol/LDL-chol ratio, in 24 volunteers; the levels of apoproteins A1 and B did not change during this period. Thus, soy milk seems to exert an anti-atherogenic effect. KMD

- 2543 SHIBAMOTO (T). Possible mutagenic constituents in nitrite-treated soy sauce. *Food Chem. Toxicol.* 21(6); 1983; 745-7

Soy sauce was heated with 100, 500, 1000 or 2000 ppm sodium nitrite for 30 minutes at 80 C and pH 3. The reaction mixtures with first 3 levels of nitrite were not mutagenic. In soy sauce treated with 1000 ppm. N-nitrosodietylamine was detected. Addition of a specific level of ascorbic acid with 2000 ppm to soy sauce nitrite, prevented the formation of mutagens or detectable nitrosamines. JVS

- 2544 FUKE (Y) and MATSUOKA (H). Preparation of fermented soyabean curd using stem bromelain. *J. Food Sci.* 49(1); 1984; 312-3

Preparation of fermented soyabean curd using stem bromelain as a coagulant of soy milk and an enzyme to improve the taste was investigated. After 60 days at 15 C ripening reached approximately 30-40% in curds which had stem bromelain added. The amino acids liberated in highest concentration were glutamic acid, leucine, lysine, alanine, and phenylalanine. Proteolytic activity from stem bromelain remain in the ripened curds, and activity from microorganisms appeared upon ripening. The recoveries of curds which had stem bromelain added were lower than that of a curd, which did not contain any stem bromelain. AA

- 2545 HAFEZ (YS) and HAMADA (AS). Laboratory preparation of a new soy-based kishk. *J. Food Sci.* 49(1); 1984; 197-8

KISHK, a popular Middle-Eastern fermented food is made by mixing bulgur with fermented milk (1:2) and sun-drying to 8-12% moisture contents. A laboratory method was developed for preparing a Kishk product with 14.9% protein. Bulgur-yoghurt mix (62% moisture content) was fermented at 43 C for 24 hour to 9.5% moisture. An acceptable soy-based Kishk (9.1% moisture, 17.2% protein) was also prepared by mixing soy-yoghurt with bulgur at a ratio of 2:1. Finding indicated that the protein level of this Soy-Kishk was higher than that of milk-Kishk. AA

SUNFLOWER

- 2546 WALDE (P), LUISI (PL) and PALMIERI (S). Proteolytic activity in sunflower seeds (*Helianthus annuus* L.). *J. Agric. Food Chem.* 32(2); 1984; 322-9

The crude extract of defatted meal of sunflower seeds contains at least five different exopeptidases with molecular weights of 50000-90000: two carboxypeptidases

dases with an optimum pH around 5; a proline iminopeptidase and two aminopeptidases, all with an optimum pH around 8. The crude extract also contains endopeptidase activity in the alkaline (benzoyl-DL-arginine-p-nitroanilide as the substrate) and acid pH range (casein and hemoglobin). The carboxypeptidase activity and the alkaline endopeptidase activity of the crude extracts of whole seedlings increase during germination, whereas the imino- and aminopeptidase activities remain constant or decrease. The amount of water-soluble proteins in the defatted meal of germinated seeds is maximal around the second and third day of germination. Sunflower seed meal and its water extracts also show a remarkable milk-clotting activity. AA

COCONUT

- 2547 MUJER (CV), MENDOZA (EMT) and RAMIREZ (DA). Coconut peroxidase isoenzymes: Isolation, partial purification and physicochemical properties. *Phytochemistry*. 22(6); 1983; 1335-40

GROUNDNUT

- 2548 ANON. Peanuts: a billion-dollar crop. *J. Am. Oil Chem. Soc.* 60(10); 1983; 1723-33

This is a comprehensive techno-economic review of peanuts which constitute the "world's No.3 oilseed crop". Trends in the production of and trade in peanuts and peanut oil have been reported on a world-wide scale. Ways of increasing the consumption of peanuts by finding new types of uses for peanut products have been discussed. There are separate notes on peanut varieties, aflatoxin-resistant strains, work of George Washington Carver on utilization of peanuts, and use of peanut oil as a diesel fuel. KMD

- 2549 SALAZAR (AJ) and YOUNG (CT). An automated methylthymol blue method for calcium determination in peanuts. *J. Food Sci.* 49(1); 1984; 209-11

Shelled and cured groundnuts (20 g) are ground in 2% TCA (200 ml) for 1 minute and filtered. The filtrates are analysed using modified spectrophotometry at the rate of 60/hour. Results obtained by this method correlate with those obtained by atomic absorption spectrophotometry. The procedure is ideal for groundnuts with Ca concentration ranging from 30-100 mg Ca /100g. However, high magnesium concentrations gives significant errors at low Ca concentrations. MVG

- 2550 ROSEN (RT), ROSEN (JD) and DiPROSSIMO (VP). Confirmation of aflatoxins B₁ and B₂ in peanuts by gas chromatography/mass spectrometry/selected ion monitoring. *J. Agric. Food Chem.* 32(2); 1984; 276-8

The extract used for thin-layer chromatography quantitation is rapidly cleaned up by elution through a silica gel Sep-PAK cartridge and then analyzed by gas chromatography/mass spectrometry/selected ion monitoring (GC/MS/SIM) at 3000 resolution using a bonded-phase fused silica capillary column with on-column injection. Limits of detection for aflatoxins B₁ and B₂ in peanut samples were 0.1 ppb. AA

PISTACHIO

- 2551 KASHANI (GG) and VALADON (LRG). Effect of salting and roasting on the carbohydrates and proteins of Iranian pistachio kernels. *J. Food Technol.* 19(2); 1984; 247-53

The free sugars which make up 2.7% of Iranian pistachio cv Badami were identified as fructose, glucose, sucrose, maltose, isomaltose, cellobiose, raffinose and stachyose. Both protein and free amino acids contained the same seventeen amino acids, but lacked tryptophan, asparagine and glutamine. After salting and roasting, total available carbohydrates, total starches and dextrans, and total free sugars all decreased compared to controls, as did a number of individual sugars, especially the reducing sugars. While free amino acids had severely decreased, total protein amino acids and individual protein amino acid were not affected at all. The decreases in reducing sugars and in free amino acids may be due in part to their taking part in Maillard reactions. AA

TUBERS AND VEGETABLES

- 2552 WILLS (RBH), WONG (AWK), SCRIVEN (FM) and GREENFIELD (H). Nutrient composition of Chinese vegetables. *J. Agric. Food Chem.* 32(2); 1984; 413-6

- 2553 ADAMBOUNDU (TL), CASTAIGNE (F) and DILLON (JC). Lowering the water activity of tropical vegetables by partial osmotic dehydration. *Sci. Aliment.* 3(4); 1983; 551-67 (French)

Four tropical vegetables - okra, pimento, tomato, and aubergine (also called egg-plant or brinjal) - were stored in brines, containing 20 and 26.6% NaCl, and having different a_w values. The transfer of water and NaCl was studied by measuring the weight of the vegetables and the weight and concentration of the brines from time to time. Correlations were established between the refractive index, the water activity, and the NaCl concentration. Blanching of the vegetables did not reduce their water activity, but it did improve their appearance. In the course of osmosis, three phases of concentration variation were observed - in other words, the slopes of the curve had three significantly different values, depending on the phase of osmosis, and also on vegetable used in the experiment. KMD

- 2554 ADAMBOUNOU (TL), CASTAIGNE (F) and DILLON (JC). Microflora evolution during storage of tropical, brined vegetables. *Sci. Aliment.* 3(4); 1983; 569-88 (French)

The effects of different working conditions on the preservation of tropical vegetables - okra, pimento, tomato, and aubergine (or brinjal) - in brine (containing 20 or 26.6% NaCl) have been studied. There was a significant difference between the total microbial counts, as well as between the yeast counts and mould counts at the two a_w -values, 0.80 and 0.84. Additives such as propyl-p-hydroxybenzoate and potassium sorbate had a significant effect on the evolution of the microflora. Storage for 13 weeks reduced the microbial load in brined vegetables. Blanching did not produce any significant effect on the evolution of microflora, whereas a combination of blanching and additives did produce a significantly greater difference in the

total microbial count of aubergines than in the other vegetables. Visual observation - as a test for predicting the microbiological condition of brined vegetables - gave a correlation coefficient of 0.63 for pimentoes, and of 0.75 for aubergines. KMD

- 2555 ENGST (R), KONIG (R), BECKMANN (G) and LAUTERBACH (K). Studies on the contamination of foods and feeding stuffs from selected areas of the district of Erfurt with lead and cadmium. Part IV. On the burden in vegetables at the vegetable growing centre in the region of Erfurt. *Nahrung*. 27(7); 1983; 633-44 (German)

- 2556 HAYAKAWA (K-I) and SUCCAR (J). A method for determining the apparent thermal diffusivity of spherical foods. *Food Sci. + Technol.* 16(6); 1983; 373-5

A method, based on the analysis of a transient heat conduction formula, was developed for the experimental determination of the thermal diffusivity value of a spherical, homogeneous sample, together with a method of predicting an error in this value. The procedure was used to determine the diffusivity of fresh tomatoes and potatoes. KMD

ONION

- 2557 BRAHMA SINGH and MOHAN KUMAR (BL). Dehydration of onion varieties. *Indian Food Packer*. 38(2); 1984; 67-74

Suitability of onion varieties for dehydration was tested with 6 white and 8 red onion varieties by dicing them to 3/8 inches flakes and drying in a cross flow drier at 60 C for 10 hours. Dehydrated onions were packed in paper aluminium foil laminates and kept at room temperature (23-30 C) for 3 months and compared with those stored without dehydration. The drying ratio among the varieties ranged from 6.3:1 to 10:1; white varieties showed lower drying ratio than the red varieties. Dehydration ratio ranged between 1:4.26 and 1:4.94. The loss of pungency during dehydration ranged from 29.5 to 81.9% among the varieties. Red variety retained pungency better than white variety. Fresh bulbs of Pusa red and Udaipur 101 (red) showed minimum losses (8-10%) during storage for 3 months at ambient temperature followed by white variety Udaipur 102. Udaipur 101 and Udaipur 102 varieties of white and red onions were found most suitable for dehydration. BSN

- 2558 BILYK (A), COOPER (PL) and SAPERS (GM). Varietal differences in distribution of quercetin and Kaempferol in onion (*Allium cepa* L.) tissue. *J. Agric. Food Chem.* 32(2); 1984; 274-76

The dry skins, and outer/inner rings were separated and extracted with methanol to obtain flavonol glycosides; these were then hydrolysed to aglyconols. Flavonols were determined by TLC, HPLC and spectrometry. Quercetin was found in strains as glycosides and aglycones with a maximum of 60 mg/kg fresh weight of edible material. JVS

POTATO

- 2559 KNAACK (H), MULLER (G) and GRUNERT (S). Investigations on the sulphiting of peeled potatoes. 1. Technological and chemical/microbiological problems of sulphiting, and proposals for the improvement of production conditions. *Lebensmittel-industrie*. 30(6); 1983; 273-5 (German)

The concentration of sodium bisulphite and the microbial count in a solution used for sulphitizing mechanically peeled potatoes were measured. When the throughput reached the value of 21 tonnes of potatoes per day, a drop in the sodium bisulphite concentration was observed, despite the fact that the concentration was frequently made up to its initial value. The number of aerobic and anaerobic bacteria and yeasts also increased, and sometimes reached as high as 1 million per cm^3 . Some suggestions have been made for improving the sulphitizing technology. KMD

- 2560 SCHLIMME (DV), ASHBY (BH), TURCZYN (MT), FOWKE (M) and VO (Q). Damage to French-fried potatoes caused by simulated transport and handling tests at cryogenic temperatures. *J. Food Sci.* 49(1); 1984; 217-20

Keeping (as during transport) frozen French-fried potatoes for 12 hours at cryogenic temperatures did not cause any impairment of sensory quality, though the product was more fragile than at -18°C . Normal handling and transport conditions, however, should not cause unacceptable breakage. The feasibility of CO_2 snow for refrigerating the product during rail car transport was established. However, dropping of boxes containing the product should be avoided both at cryogenic and noncryogenic temperatures to maintain premium length quality. MVG

- 2561 JOHNSON (H) and HELLENAS (K-E). Total glycoalkaloids (TGA) in Swedish potatoes. *Var Foda.* 35(6-7); 1983; 299-14 (Swedish)

Levels of total glycoalkaloids (TGA) were determined in 165 commercial samples of Swedish potatoes, by first extracting the fresh tissue with methanol/chloroform (2:1), followed by colorimetric estimation with paraformaldehyde and ortho-phosphoric acid (Clarke's reagent). The effect of peeling on boiled potato tubers was also examined. The TGA values ranged between 2 and 30 mg/100g fresh weight. Out of 111 samples, 9 samples had a TGA content in excess of the safe limit of 20 mg/100 g. fresh weight. Most of these 9 samples had been collected early in the season. Small tubers contained more TGA than big ones. Peeling of the raw potatoes before boiling resulted in removal of more than 70% of the TGA. Manual peeling of boiled tubers resulted in a lower weight loss, but had a variable effect on TGA-content. KMD

- 2562 MAINI (SB), BRIJESH DIWAN, BHAWALKAR (RH) and ANAND (JC). Utilization of solar energy for acid hydrolysis of starch. *Indian Food Packer.* 38(2); 1984; 64-6

Potato chips were dried, powdered and hydrolysed with different concentrations (0.5, 1.0, 1.5, 2.0, 2.5 and 3.0%) of HCl in the solar oven designed by National Physical Laboratory, New Delhi, India. At HCl concentration of 2%, hydrolysis of starch was complete (as tested by iodine solution) in 5 hours; the temperature variation in solar cooker was $45-96^\circ\text{C}$. BSN

- 2563 SLANINA (P). Toxicology and health risk evaluation of potato alkaloids. *Var Foda.* 35(6-7); 1983; 315-320 (Swedish)

High levels of two glycoalkaloids (GA) - namely, α -solanine and α -chaconine - have been detected in certain varieties of Swedish potatoes. The concentrations of these GA increased under the influence of various environmental and stress factors. It has been shown that, in animals, the GA inhibit cholinesterases, and produce a low positive inotropic - or digitalis-like - effect on the heart; but no long-term toxic effect has been demonstrated so far. In man, acute GA poisoning produces gastro-intestinal symptoms and neurological disturbances. The toxic dose is not known, but the highest non-toxic concentration in potatoes is put at 20 mg/100 g. KMD

- 2564 SHIBAMOTO (T). Ames mutagenicity tests of products from a heated potato-starch system. *Food Chem. Toxicol.* 22(2); 1984; 119-22

A charred sample was prepared from potato starch heated with ammonium carbonate at 600 C in a flask under a nitrogen stream. The water produced was collected and extracted with methylene chloride. The basic fraction obtained from the extract exhibited strong mutagenicity in Ames assays using *Salmonella typhimurium* strains TA98 or TA1000 with metabolic activation (rat-liver S-9 mix). The basic fraction was further fractionated by silica gel column chromatography and subsequently by Sephadex column chromatography. Some of the resulting fractions exhibited strong mutagenic activities in *S. typhimurium* strain TA98 with S-9 mix. AA

- 2565 GREENFIELD (H), MAKINSON (J) and WILLS (RBH). Lipids in French fries: a retail and laboratory study. *J. Food Technol.* 19(2); 1984; 239-45

The lipid content of prepared restaurant and takeaway French fries varied from 6.2 to 20.8 g/100 g, and of frozen retail fries from 2.1 to 5.3 g/100 g, as purchased, and from 12.0 to 20.0 g/100 g after finish frying. The lipid composition (fatty acid profile and cholesterol content) of all retail samples reflected the predominant use of animal fat in the Australian industry. Laboratory studies showed that the lipid content of French fries was increased by decreased chip size, and by the common commercial practice of split frying which caused a doubling of fat uptake when compared with single frying. Commercial practices appear to increase the potential of fries as a fat carrier. AA

CASSAVA

- 2566 EL TINAY (AH), BURENG (PL) and YAS (EAE). Hydrocyanic acid levels in fermented cassava. *J. Food Technol.* 19(2); 1984; 197-202

The extent of loss of hydrocyanic acid during the fermentation of cassava tubers selected from both sweet and bitter varieties in the traditional method (whole unpeeled tubers) compared with the fermentation of peeled tubers and crushed pulps with or without the addition of water. Although the traditional fermentation is terminated after 3-4 days, in this study the fermentation was allowed to proceed for 8 days. Loss of cyanide from the whole tubers was 80-87% after 8 days and was only 51-53% after 4 days., loss of cyanide from the whole sweet tuber was not significant after 5 days. The loss of cyanide from the peeled tubers was comparable to the whole tubers after 8 days of fermentation. However, there was a marked decrease in free cyanide in the 1st day of fermentation of the peeled tubers compared to whole tubers. The loss in cyanide in the crushed pulp, which occurred primarily in the 1st day, appears to be due to the action of endogenous linamarase rather than hydrolysis by fermentation. When water is added to the crushed pulp the reduction in cyanide was 83-91% with marked decrease in bound cyanide in the 1st day of fermentation. It seems that autohydrolysis is enhanced by addition of water to the crushed pulp. AA

YAM

- 2567 HARVEY (PJ) and BOULTER (D). Isolation and characterization of the storage protein of yam tubers (*Dioscorea rotundata*). *Phytochemistry*. 22(8); 1983; 1687-93

AMARANTHS

- 2568 PANT (KC). Studies on the nutritional quality of grain amaranths. *Nutr. Rep. Int.* 28(6); 1983; 1445-56
 Amaranth had higher content of protein (14.5-17.9%), lysine (4.7-5.82 g/16 gN) and calcium (197.5-389.0 mg/100 g), but had lower content of nicotinic acid (0.68-0.94 mg/100 g). The NPR of grain amaranths was significantly higher than that of wheat and supplementation with amaranth protein significantly enhanced the NPR of wheat protein. KAR

LUCERNE

- 2569 HAZLEWOOD (GP), HORSNELL (JM) and MANGAN (JL). Trypsin isoinhibitors of lucerne Association with leaf fraction. I. protein. *Phytochemistry*. 22(5); 1983; 1107-11

SPINACH

- 2570 JAWALI (N) and SANE (PV). Inhibition of the nitrate reductase complex from spinach by oxylamines. *Phytochemistry*. 23(2); 1984; 225-8
- 2571 RUSSELL (LF), MULLIN (WJ) and WOOD (DF). Vitamin C content of fresh spinach. *Nutr. Rep. Int.* 28(5); 1983; 1149-58

TOMATO

- 2572 LUH (BS), SARHAN (MA) and WANG (Z). Pectins and fibres in processing tomatoes. *Food Technol. Aust.* 36(2); 1984; 70-73
 Six varieties of processing tomatoes in commercial production were evaluated for this molecular size of carbohydrate polymers and pectin contents. The consistency of the canned pastes and the acid detergent fibre in the canned pastes were investigated. KAR
- 2573 WILLS (RBH), LIM (JSK) and GREENFIELD (H). Composition of Australian foods. 22. Tomato. *Food Technol. Aust.* 36(2); 1984; 78-80
- 2574 GROSS (KC). Changes in free galactose, myo -inositol and other monosaccharides in normal and non-ripening mutant tomatoes. *Phytochemistry*. 22(5); 1983; 1137-9
- 2575 SAPERS (GM), PHILLIPS (JG) and DIVITO (AM). Correlation between pH and composition of foods comprising mixtures of tomatoes and low-acid ingredients. *J. Food Sci.* 49(1); 1984; 233-5, 238

Acidity and pH data for more than 100 products comprising mixtures of tomatoes and low-acid ingredients were compared to develop a generalized method of pH prediction. Products and their major ingredients were titrated with NaOH or acetic acid to pH 4.6 and 8.1 endpoints. Two indices of acidity, developed from these data, were correlated with product pH values, and regression equations for pH prediction were obtained. The accuracy of prediction was improved by correlating the data for related products such as soups, sauces, and simple tomato-vegetable mixtures. Correlation coefficients as high as 0.9 were obtained with the last category. These results demonstrate the feasibility of pH prediction from recipe data. AA

- 2576 GOEDICKE (H-J), SIEBER (K) and LINK (V). On the behaviour of Fenazox residues on plants. Part II. Residue behaviour of Fenazox on tomatoes and leaf surfaces. *Nahrung*. 27(8); 1983; 753-8 (German)

As use of "Fentoxan" is now permitted in tomato cultivation also, the authors have described a method of determining residues of Fenazox on the surfaces of tomato leaves. The half-life values of Fenazox, as determined under the test conditions, were 1.4 days on tomatoes and 2.3 days on tomato leaves respectively. To ensure food hygienic quality of tomatoes after cold fumigation, a waiting period of 4 days or 7 days is advised, at dosages of 0.3 and 0.5 ml/m² respectively. After a spraying, the waiting period should be 14 days. KMD

CAPSICUM ANNUUM

- 2577 ADISA (VA). Fruit rots of *Capsicum annum* L. and *C. frutescens* L. in Nigeria. Part III. Effect of post-harvest infection by two *Fusaria* species on a few nutrients. *Nahrung*. 27(7); 1983; 669-74

The effects of temperature on rot infections produced by *Fusarium oxysporum* and *F. zizideti* on the sugars and ascorbic acid levels in pepper fruits were investigated. There was a gradual decrease to a total loss of ascorbic acid in infected fruits (at 25 C) with increase in incubation period (14 days). In infected fruits stored at 30 C during the 8 days of incubation, a total loss of this acid was also recorded. There were fluctuations in the levels of reducing sugars in diseased fruits stored for 8 days at different temperatures, while a gradual decrease in amount of sugars was recorded in infected fruits at a temperature of 25 C during 14 days of incubation. AA

PLANTAIN

- 2578 OLORUNDA (AO) and TUNG (MA). Effects of calcium pre-treatments and freezing rates on fluid loss from plantain products. *J. Food Technol.* 19(2); 1984; 133-9

Ripe plantain slices treated with calcium chloride (0, 1360 or 2700 ppm Ca) solutions were packed one layer thick in flexible pouches prior to freezing in still air at -18 to -20 C, liquid immersion at -18 to -20 C, and cryogenically in liquid nitrogen. A new technique in which the extent of fluid loss from thawed plantain slices could be associated with tissue damage was used to assess quality of the thawed plantain slices. Plantain frozen in liquid nitrogen had the least fluid loss followed by liquid immersion and still air freezing. Treating with calcium ions prior to freezing significantly reduced fluid loss in all freezing methods used. In another experiment, the treated plantain slices were frozen in still air -18 to -20 C

followed by sensory evaluation of the thawed slices after frying in hot peanut oil. Calcium also significantly increased firmness in the treated slices compared to the control and there were no adverse effects on flavour and appearance. The techno-economic implications of the study are discussed. AA

CUCURBIT

- 2579 SALVO (F), TRIPODO (MM) and DUGO (G). Determination of fructose and glucose in cucurbitaceae by h.p.l.c. *J.Sci. Food Agric.* 35(2); 1984; 212-4
- High performance liquid chromatography (HPLC) has been used and data presented on the fructose and glucose contents on *Cucurbita maxima* and its 2 varieties, *C. ficifolia*, *Cucumis sativus*, *Sechium edule* and *Cucurbita pepo*, all used as vegetables. The HPLC system consisted of a μ -Bondapork/carbohydrate packed column., a solvent system of acetonitrile-water with a specified flow rate and a refractive index detector. The analysis took less than 45 minutes. JVS

FRUITS

- 2580 MIRZAEV (MM), TAIROV (Z), UMAROV (GG) and NABIKHANOV (B). On the investigation of drying of fruit and grapes in solar installations. *Appl. Solar Energy.* 18(6); 1982; 51-3
- A combined solar drying installation for dehydration of apples and grapes has been designed, setup and its details have been reported. The drying process reduction is achieved by a factor of 2-3.5 as compared to air/solar method and the resulting product is of high quality. The chamber may also be used as a fumigation chamber for production of dry fruits. BSN
- 2581 FADY (C). Objective tests for fruit flavour quality - Commercial utilization of these criteria. *Fruits.* 38(7-8); 1983; 547-51 (French)
- The organoleptic quality of fruits can be assessed by simple measurements such as the content of sugar and of acid, and the firmness. Some indices of quality have been suggested for the principle species of fruits, viz: apples (3 varieties), pears, prunes, pineapples, peaches, melons, cherries and strawberries. These indices are being used, at present, in the selection of fruit lots sold under a trade-mark or label. KMD
- 2582 VORAGEN (FGJ), TIMMERS (JPJ), LINSSSEN (JPH), SCHOLS (HA) and PILNIK (W). Methods of analysis for cell-wall polysaccharides of fruit and vegetables. *Z. Lebensmittel-Unters Forsch.* 177(4); 1983; 251-6
- 2583 WITTKOWSKI (M), BALTES (W), KRONERT (W) and WEBER (R). Determination of alternaria toxins in fruit and vegetable products. *Z. Lebensmittel-Unters. Forsch.* 177(6); 1983; 447-53 (German)
- A reverse phase HPLX method for the determination of the *Alternaria* mycotoxins alternariol (AOH), alternariol monomethyl ether (AME), altenuene (ALT) and altertoxin I (ATX-I) in fruit and vegetable products is described. The procedure has good sensitivity. The results are corroborated by TLC. About 50 commercial products and about 20 mouldy fruits were analysed. None of the commercial products was contaminated with the toxins, whereas two of the mouldy samples (apples) contained 160 ppb AOH and 250 ppb AME respectively. AA

- 2584 SPIES (A) and MEISCHAK (G). About the problems of the presence of toxic heavy metals in products of the fruit and vegetable processing industry. *Lebensmittel-industrie*. 30(5); 1983; 203-8

PASSION FRUIT

- 2585 DEVAPRIYA KUMAR (S). Passion fruit: The fruit of the future for Indians. *Chem. Age India*. 35(2); 1984; 99-100
Cultivation, chemical composition and processing aspects have been covered in the publication. KAR

PINEAPPLE

- 2586 RALE (VB). SCP from pineapple (*Ananas sativa* Schutt) cannery effluents. *Appl. Microbiol. Biotechnol.* 19(2); 1984; 106-9
Hansenula sydowiorum in pineapple cannery effluents produces 45.0 g/l, 21.9 g/l, 1.5% and 6.4% of cell biomass, protein, DNA, and RNA respectively in batch fermentation. Amino acid profile, digestibility, NPU, and actual feed experiments confirm the applicability of the product concomitantly. A 90% reduction in BOD value of the effluent can be effected during this process. KAR

GRAPE

- 2587 RIVA (M) and PERI (C). A study of grape drying. 1. Effect of dipping treatments on drying rate. *Sci. Aliment.* 3(4); 1983; 527-50 (French)

The effects of different pretreatments applied to grapes on their rate of dehydration in hot air have been studied. Treatment of the grape with alkali has only a superficial effect which is partly chemical (dissolution of the waxy layer) and partly mechanical (causing micro-fracture of the pellicule). As a result, drying is very fast in the initial stages, but slows down considerably, because of the resistance to internal diffusion in the later stages. In contrast, dipping in an alkaline solution of ethyl oleate simultaneously reduces the resistance of the tissues of the pellicule and the resistance to internal diffusion, so that the time required for drying is reduced to 1/3 or 1/4 of the time needed to dry untreated grapes. Another advantage of the second pretreatment is the lowering of the drying temperature. KMD

- 2588 MANDAL (NC) and DASGUPTA (MK). Postharvest diseases of perishables in West Bengal (India): Control of spoilage of grapes due to *Aspergillus niger* Van Tiegh and *Botryodiplodia theobromae* PAT. *Fruits*. 38(7-8); 1983; 571-8
Among the six moulds that cause damage to grapes in West Bengal, the most destructive ones are *Aspergillus niger* and *Botryodiplodia theobromae*. Losses of 6-60% have been observed during the principal season for market arrivals. No pre-inoculation treatment is effective against *A. niger*; good results have been obtained only by steeping the infected grapes in 500 ppm bavistin for 10 minutes. Potassium metabisulphite (2.5%) was very effective in the pre-infection stage; it reduced infection of *B. theobromae* by 93.3%. Thiabendazole and bavistin can control this infection after it has occurred. The best results against *B. theobromae* have been obtained with a combination

of bavistin (0.1%) and potassium metabisulphite (2.5%). Cold storage of grapes at 3-5.5 C for 35 days, followed by storage in the open air for 10 days was quite effective in preventing spoilage. Assuming an average loss of 23%, the annual loss in India would amount to 90,000t, valued at \$16 million. The cost of treatment is estimated at \$0.20 per kg, and it would reduce the loss by atleast 20%. KMD

- 2589 CLINGELEFFER (PR). Effects of time of season, fruit depth and covering at night, when ground drying, on acceptable moisture content of Sultana raisins. *J. Sci. Food Agric.* 35(2); 1984; 173-81

Drying of Sultana raisins was adversely affected and non-uniform when fruits were spread in layers of more than 25 mm (depth of 3-4 fruits) covering of fruits during nights was not found necessary since moisture pick-up was slow; the dew on the surface of berries evaporated in the morning, due to increased solar radiation. Drying conditions became unfavourable when the season progressed from March to May because of intensity of solar radiation and decreased day length. JVS

CITRUS

- 2590 GOVINDARAJAN (VS), RANGANNA (S) and RAMANA (KVR). Citrus fruits. Part II. Chemistry, technology and quality evaluation. C. Quality evaluation. *CRC Crit. Rev. Food Sci. Technol.* 20(2); 1984; 73-122

Discusses: standards; sensory quality; fruit quality; single strength juice; citrus concentrates; essential oils and aroma concentrates; analytical methods for miscellaneous compounds affecting quality; and detection of adulteration. BSN

MANDARIN

- 2591 MARSHALL (MR). Nonenzymatic oxidation of linoleic acid by extracts of tangerine rag. *J. Food Sci.* 49(1); 1984; 308-9

Tangerine extracts consumed oxygen when incubated with linoleic acid. Most of the oxygen consumption was associated with the supernatant of a 76% ethanol cut. Boiling the extracts for 5 minutes reduced oxygen consumption by only 50%. Ultrafiltration caused a decline (80%) in oxygen consumption. Ethylenediaminetetraacetic acid (7 mM) reduced the rate of oxygen consumption in the reaction mixture. Cyanide (1 mM) completely inhibited the rate of oxygen consumption. The major lipid oxidation activity of tangerine rag appears to be catalyzed by metals present in the extracts and is not enzymatic. AA

OLIVE

- 2592 SCIANCALEPORE (V) and LONGONE (V). Polyphenol oxidase activity and browning in green olives. *J. Agric. Food Chem.* 32(2); 1984; 320-321

In five olive (*Olea europaea* L.) varieties, a positive correlation was found between browning rate of the crude homogenate of the fruit and polyphenol oxidase (PPO) activity in the crude enzyme extracted from the acetone powder prepared from each variety. The possibility of the presence of an inhibitor, an inactivator, and/or an activator in the crude enzyme was

tested in various ways and ruled out. It was, therefore, concluded that the differences in the browning rate of the olive varieties studied were directly related to the PPO activities as expressed in the enzymatic extracts. AA

CHERRY

- 2593 THIBAUT (J-F). Enzymatic degradation and β -elimination of the pectic substances in cherry fruits. *Phytochemistry*. 22(7); 1983; 1567-71

Pectic substances from cherry fruits (*Prunus avium*) were studied after extraction and purification. They were subjected to β -elimination by heat treatment and depolymerized by endopolygalacturonase from *Aspergillus niger*. The degraded pectins were fractionated by gel permeation chromatography (Sephadex G-100, Bio-gel P2). The results suggest that the pectic substances largely consist of an α -D-galacturonic backbone interspersed with occasional L-rhamnosyl residues. Neutral sugars as side-chains of varying lengths appear to be concentrated along certain regions of the polymer ('hairy') in contrast to side-chain free ('smooth') parts. AA

PEACH

- 2594 LEONARD (SJ), HEIL (JR), CARROAD (PA), MERSON (RL) and WOLCOTT (TK). High vacuum flame sterilized fruits: Influence of can type on storage stability of vacuum packed peach and pear slices. *J. Food Sci.* 49(1); 1984; 263-6

The feasibility of using enameled tin and tin-free steel (TFS) cans for processing oxygen sensitive fruits by high vacuum flame sterilization was evaluated. Through 18 months storage at ambient temperatures, the appearance and quality of the HVFS peaches and pears remained acceptable for all can types. Fruits packed into plain tin cans appeared brighter and tasted tastier than those packed into TFS or inside-enameled tin cans. Texture, pH and titratable acidity of fruit were not measurably affected by variation in can types. Mechanical deterioration followed by flame sterilization, produced a product with quality comparable to that achieved in flame deaerated packs. AA

- 2595 CARTER (GE) Jr. and RILEY (MB). Dibromochloropropane residues in peaches following fall orchard fumigation. *J. Agric. Food Chem.* 32(2); 1984; 186-7

1,2-Dibromo-3-chloropropane (DBCP) is an active ingredient of nematocides. DBCP residues were not detected in peaches grown on soil fumigated at/ below the previously recommended level of 46.8 litre per treated hectare. At application level of 58 litre per treated hectare, residue level of 0.19 ppb of DBCP was detectable. Even more of residues were found at still higher levels of application. JVS

APPLE

- 2596 NARASIMHAM (P), HABIBUNNISA, KRISHNA PRAKASH (MS), KRISHNA PRASAD (CA), VIJAYENDRA RAO (AR) and RODRIGUEZ. Semi-commercial trials on cold storage and marketing of apples of Himachal Pradesh. *Indian Food Packer*. 38(2); 1984; 32-54

Apples of 4 varieties ((i) Royal Delicious, (ii) Richa-red (iii) Red Delicious and (iv) Golden Delicious) were graded, packed in wooden cases,

and transported in lorry from Thandehar of Simla district (N.India) to Bangalore and were cold stored (32-34 F, RH 85-90%). Fruits were observed every month for physiological loss in weight (PLW), and % shrivelled and spoiled apples for 5 months. When the % shrivelling was >25%, apples were sold by retail sale. Rate of shrivelling was low with large apples than with small apples. Red Delicious was more prone to shrivelling than other varieties and shrivelling exceeded 25% at 2 months of storage. Apples from different orchards also differed in the extent of shrivelling. The PLW was the same for different sizes; but the symptoms appeared first in smaller fruits; varietal difference in PLW was not observed. Fungal spoilage in apples was only 1.6-5.4% during 4 months of storage; spoilage was more in Richa-Red and Red Delicious variety and it was more in larger than in smaller apples. From the sale of apples, it is concluded that it is uneconomical to store the smaller sized apples > 2 months and bigger apples > 3 months. The transportation cost and landed cost at Bangalore for the different varieties and different size (extra large, large, medium and small) have been worked out. KAR

- 2597 PERRING (MA). Redistribution of minerals in apple fruit during storage. Preliminary investigations with the variety spartan. *J. Sci. Food Agric.* 35(2); 1984; 182-90

AVERRHOA CARAMBOLA

- 2598 GROSS (J), IKAN (R) and ECKHARDT (G). Carotenoids of the fruit of *Averrhoa carambola*. *Phytochemistry*. 22(6); 1983; 1479-81

The carotenoids of the tropical fruit *Averrhoa carambola* were investigated and from most of them mass spectra were taken. The total carotenoid content was 22 µg/g fr.wt. The carotenoid pattern was uncommon, the main pigments were phytofluene (17%), β -carotene (25%), β -cryptoflavin (34%) and mutatoxanthin (14%). Additionally, β -carotene, β -apo-8'-carotenal, cryptoxanthin, cryptochrome and lutein were present in small amounts. AA

CHERIMOYA

- 2599 IDSTEIN (H), HERRES (W) and SCHREIER (P). High-resolution gas chromatography-mass spectrometry and fourier transform infrared analysis of cherimoya (*Annona cherimolia*, Mill.) volatiles. *J. Agric. Food Chem.* 32(2); 1984; 383-9

SUGAR, STARCH AND CONFECTIONERY

SUGAR

- 2600 KROLOP (J), KLEINWACHTER (R) and PAUSCHKE (R-D). Application of process computers in the sugar industry. *Lebensmittel-industrie*. 30(6); 1983; 276-7 (German)

The process computer PRS 4000 has been successfully introduced in a continuously operating sugar factory for the continuous regulation and optimization of the production process. KMD

CHITOSAN

- 2601 YANG (T) and ZALL (RR). Chitosan membranes for reverse osmosis application. *J. Food Sci.* 49(1); 1984; 91-3

Alkali resistant reverse osmosis membranes were fabricated by spreading solutions of chitosan, a poly-N-acetyl glucosamine, in 2.0% acetic acid on a glass plate. The membrane had a flux rate of $1.67 \times 10^{-3} \text{ cm}^3/\text{cm}^2/\text{seconds}$ and a salt rejection capability of 78.8% with 0.2% NaCl at 680 psi. Addition of 40% polyethylene glycol to the membrane casting solution increased permeability, while 10% chloromethyl oxirane improved durability of the membranes. AA

CONFECTIONERY

- 2602 GRONINGER (KG). Water activity, quality, and shelf-life of confectionery. *Getreide Mehl Brot.* 37(9); 1983; 281-6 (German)

Water activity is being used increasingly as a definition of humidity of foods, instead of water content. All, important, product reactions occur within a single water-activity zone, for a given product. The relationship between sorption isotherm, hygroscopicity, and diffusion coefficient has been elucidated. The function of packaging has been considered, and moisture-control cupboards have been suggested as an alternative to conventional packages; they are more economical in terms of energy and cost. A new water-activity sensor is presented, and some criteria for the use of moisture-sensors have been explained. Product and process analyses are indispensable of moisture-controlled production and storage. KMD

BAKERY PRODUCTS

DOUGH

- 2603 SPICHER (G) and NIERLE (W). Proteolytic activity during sour dough fermentation. *Getreide Mehl Brot.* 37(10); 1983; 305-10 (German)

It has been confirmed that lactic acid bacteria initiate a proteolysis in sour dough, and, consequently, the content of amino acids in the sour dough increases during its fermentation. Changes are noticed especially in the contents of leucine, phenylalanine, methionine, tyrosine, lysine, and isoleucine. *Lactobacillus plantarum* produces a greater degree of proteolysis than *L. brevis* ssp. *lindneri*, and *L. fructivorans*. Proteolysis was affected by the temperature of sour dough development (greatest between 25-35 C), and the extraction rate of the flour, and to a lesser extent by dough yield. Bacteria other than the aforementioned three species are also involved in the proteolysis. KMD

BREAD

- 2604 POMERANZ (Y). Protein-enriched bread in the USA. *Getreide Mehl Brot.* 37(9); 1983; 277-81 (German)

Protein enriched bread in the U.S.A. should have a minimum protein content of 22% on dry weight basis. It normally contains about 12% of soya

products. This implies prior elimination of anti-nutritive factors, and also, of the beany taste. The effects of incorporation of various soya products on the cost, nutritive value, and sensory properties of bread have been discussed. Bread which has been only slightly enriched with protein contains about 3% of soy flour (as a substitute for milk). This type of bread resembles the normal pan-baked white bread very closely. KMD

- 2605 MENDEN (E). Nutritional-physiological assessment of bread and other baked products. *Getreide Mehl Brot*. 37(10); 1983; 315-7 (German)

A critical examination of the nutritional situation in both East and West Germany, Great Britain, Norway, Sweden, and the U.S.A., has led uniformly to the conclusion that the consumption of bread, especially from flours of high extraction rates should be increased. This proves, once again, the high nutritive value of cereals in a rational diet; the conclusion is supported by experimental as well as epidemiological data. KMD

- 2606 POLLHAMER (S). The modifying action of "Bulata" and "Bulata 3" on the quality of bread and small baked goods. *Getreide Mehl Brot*. 37(10); 1983; 302-5 (German)

Baked products of very good quality were produced in big bakeries when "Bulata", a Hungarian baking additive, was used together with the emulsifier "Datamul 4720" (made by Th. Goldschmidt AG, Essen). This combination also improved the quality of bread made from wheat varieties that are poor in enzymes and proteins, especially those which give high yields under intensive fertilization. A further improvement in quality is possible when one adds nutrient salts, vitamins, and vital gluten to the above-mentioned combination. KMD

- 2607 ROTHE (M) and RUTTLOFF (H). Aroma retention in modern bread production. *Nahrung*. 27(5); 1983; 505-12

In highly industrialized countries bread consumption rate decreases in favour of flavour-intensive foods like meat, sweets, cocoa products or alcoholic beverages. This trend which is unfavourable from the nutritional point of view may be forced by flavour losses in modern bread technology itself. Sensory profile studies indicate 4 points which may change the traditional bread flavour, i.e. reduction of flour extraction rate, changes within bread formula, shortening of the dough procedures or of baking time. Possible ways for improving bread flavour in modern technology are discussed. The use of precursor systems as well as of biotechnical procedures deliver chances for future bread production with improved flavour quality. AA

- 2608 PAREDES-LOPEZ (O) and COVARRUBIAS-ALVAREZ (MM). Influence of gamma radiation on the rheological and functional properties of bread wheats. *J. Food Technol.* 19(2); 1984; 225-31

Two wheat cultivars were selected to represent medium strong and weak dough mixing strengths. Falling number values were severely depressed at doses of 500 and 1000 krad. Rheological dough properties, as assessed with the mixograph and farinograph, were also investigated. Radiation at medium doses produced an increase in the farinograph water absorption for both wheats. Radiation decreased the amount of bound water as compared to the control sample. For the medium-strong wheat, low levels of radiation produced bread with volumes and overall bread quality equal to or slightly better than those of the control flour, whereas for the weak wheat an improvement of the baking performance was obtained at all the low doses of radiation. However, the overall bread quality of both wheats was highly reduced at medium doses of radiation. AA

- 2609 HARINDER (K), MANINDER (K) and BAINS (GS). Effect of cereal, fungal and bacterial α -amylase on the rheological and breadmaking properties of medium-protein wheats. *Nahrung*. 27(7); 1983; 609-18

Optimal levels of cereal malt, fungal and bacterial α -amylase for baking of medium-protein flours were found to be 5-10, 20 and 0.35 SKB/100 g, respectively. The dough consistency decreased considerably with time, depending on the source and level of α -amylase. The paste viscosities of the flours were reduced considerably by the cereal malts even at 2.5 SKB/100 g than by the fungal and bacterial α -amylase used optimally. Satisfactory loaf volumes were obtained with optimised α -amylase supplements without extraneous sugar in the bread formula. With 0.35 SKB of bacterial α -amylase, a bread having distinguishably softer texture was obtained as compared to cereal and fungal α -amylases. Accumulated maltose in the crumb indicated the need for a strain of baker's yeast with an active maltase system to render *in situ* contribution of α -amylase supplements more effective. AA

SPAGHETTI

- 2610 DEXTER (JE), TKACHUK (R) and MATSUO (RR). Amino acid composition of spaghetti: Effect of drying conditions on total and available lysine. *J. Food Sci.* 49(1); 1984; 225-8

Drying condition had significant effect on loss of available lysine but not on other amino acids. Loss of available lysine increased with increased high temperature (HT) and its duration. Moisture content at the onset of HT had no effect on loss of lysine. Short term HT treatment improved colour of the product and reduced lysine loss without affecting cooking quality. Cooking as such had no effect on amino acid composition and on available lysine levels. MVG

MILK AND DAIRY PRODUCTS

MILK

- 2611 TISSIER (JP), CORRIEU (G) and LALANDE (M). Study on the cleaning of milk storage tanks: Part I. Description of a method for studying the different rinsing and cleaning steps - quantification of results. Part II. Evaluation of some parameters liable to affect pre-rinse kinetics - Process design. *Food Sci. + Technol.* 17(5); 1983; 294-9, 300-307 (French)

A successful method of checking the rinsing and cleaning of milk storage tanks has been developed. Its characteristic features are: (i) a collection device supplying representative samples of soil removed from each step of the process; (ii) appropriate analytical methods for determining the effect of the treatment on the soil components; and (iii) a method of calculation for standardizing the expression of the results, independently of working conditions and tank design. Observations made during cleaning tests lead to the following conclusions: (a) after tank draining, the amount of residual soil is very small; more than 90% of the soil is rapidly removed by the rinsing process; (b) pre-rinsing can be characterized by several successive steps involving different mechanisms; and (c) the different components of milk are not removed at the same speed: lactose is eliminated first, and the proteins last. The volume of effluent used per unit of soiled surface (v/s)

determines the concentration of different components of the soil in the effluent (C/C_0). This result is not affected by varying the rate of flow within the range 0.63-2.0 m³/h/m. The pre-rinse kinetics are not affected by the nature of the rinsing solution: hard water, osmosized water, and water containing surfactants or soda (lg/l) all have nearly the same effect. A method for comparing the efficiency of cleaning balls has been described. Pre-rinsing may be achieved by the action of a falling film alone. An efficient cleaning ball must be used to obtain a falling film over the whole soiled surface. The removal rate of the most firmly attached components was increased by sprays which increased the turbulence of the falling film. KMD

- 2612 BOSSUYT (RG) and WAES (GM). Impedance measurements to detect post-pasteurization contamination of pasteurized milk, *J. Food Prot.* 46(7); 1983; 622-4

Portions of 1-L milk containing agents selective for gram-negative bacteria (0.06% benzalkon and 0.02% crystal violet) incubated at 30 C, showed detection time of less than 24 hours and that post pasteurization contaminating gram negative bacteria were absent in pasteurized milk. The detection time, however, varied between 26 and 52 hours. BSN

- 2613 BANKS (W), CLAPPERTON (JL), MUIR (DD), POWELL (AK) and SWEETSUR (AWM). The effect of dietary-induced changes in milk urea levels on the heat stability of milk. *J. Sci. Food Agric.* 35(2); 1984; 165-72

The study reveals a casual relationship between the diet of the cow and the heat stability of milk. The results of 2 experiments carried out in the study indicate that with changes in milk urea levels, heat stability of milk changes. The work demonstrates the scope for increasing the heat stability of the milk by adjusting the diet to increase urea levels in milk. JVS

- 2614 WISEMAN (DW) and MARTH (EH). Stability of aflatoxin M₁ during manufacture and storage of a butter-like spread, non-fat dried milk and dried buttermilk. *J. Food Prot.* 46(7); 1983; 633-6

- 2615 FIGGE (K) and BAUSTIAN (M). Comparative investigations of the migration of components from polymer packaging materials into milk, milk products and test foods. *Dtsch. Lebensmittel-Rundschau.* 79(9); 1983; 289-301 (German)

Between the migration values obtained after 7 or 21 days at 20 C with various milk products, is 91 or 74. The average migration factor F_w , however, obtained by use of the migration values detected with water, is only 1.8 or 1.1 and comes, therefore, very close to the ideal value 1 as given by the definition of migration factors. These results make it clear that milk and milk products under practical storage conditions interact with packaging materials mainly by their water phases; perhaps by their protein phases, but not by their fat phases. The results show, furthermore, that the amounts of components which migrate, under practical contact conditions, from plastic packages into milk or milk products can be determined in the laboratory by use of the test food, water under the standard test conditions of "10 d/40 C". AA

- 2616 RAMSEY (JA) and SWARTZEL (KR). Effect of ultra high temperature processing and storage conditions on rates of sedimentation and fat separation of aseptically packaged milk. *J. Food Sci.* 49(1); 1984; 257-62

Rates of sedimentation and fat separation were determined for stored UHT treated milk. For each of three thermal treatments used for indirect and

direct heating, homogenization pressures were 0, 10.34, or 20.68 MPa. Storage temperatures were 7, 22 and 35 C. Initial sediment deposits were greater for the direct system. Sedimentation increased with increased heat treatment and/or storage temperature but decreased as homogenization pressure increased. The indirect system had higher activation energies for sedimentation for all homogenization pressures. Fat separation rates tended to increase with increased storage temperature. The direct system tended to produce more sediment and less fat separation than the indirect system for a given thermal treatment. AA

- 2617 ZIKAKIS (JP) and SILVER (MR). Bovine milk xanthine oxidase: Effect of limited proteolysis in kinetics and structure. *J. Agric. Food Chem.* 32(2); 1984; 340-43

In the present study, bovine xanthine oxidase purified by a mild non-proteolytic method and a proteolytic method were compared. The data on electrophoresis, kinetic behaviour and specific activities were generated. Indications are that proteolysed enzyme suffers in conformational stability and catalytic efficiency besides showing affinity both for substrates and competing inhibitors. JVS

- 2618 MUIR (DD) and SWEETSUR (AWM). Optimization of the heat stability of protein-rich concentrates prepared by ultrafiltration of skim-milk. *J. Food Technol.* 19(2); 1984; 263-71

Methods of improving the heat stability of protein-rich concentrates prepared by ultrafiltration of skim-milk have been evaluated. It has been found that concentrate diafiltration promotes large increases in heat stability with little penalty in terms of processing difficulties. AA

- 2619 DESARZENS (CI), BOSSET (JO) and BLANC (B). Light induced changes of milk and some milk products. Part I. Changes of colour, taste and different vitamin contents. Part 2. Influence of some chemical and physico-chemical factors on colour changes. *Food Sci. + Technol.* 17(5); 1983; 241-7

- 2620 HADDAD (GS) and LOEWENSTEIN (M). Effect of several heat treatments and frozen storage on thiamine, riboflavin, and ascorbic acid content of milk. *J. Dairy Sci.* 66(8); 1983; 1601-6

No significant losses of thiamine and riboflavin were observed in milk subjected to HTST (72 C for 16 seconds), commercial HTST (80 C for 16 seconds), pasteurisation, commercial UHT-sterilization at 110 C for 3.5 seconds and absolute UHT-sterilization at 140 C for 3.5 seconds. During two weeks of frozen storage, losses of these vitamins were not significant. Vitamin C losses were significant, which increased with severity of heat treatment. In case of raw and heat treated milk, vitamin C content decreased significantly during two weeks of frozen storage. BSN

- 2621 ANTILA (AV). The content and antirachitic effect of vitamin D in cow's and human milk: A reevaluation of water-soluble vitamin D compound. *Sci. Aliment.* 3(4); 1983; 491-8

This review has treated vitamin D compounds present in milk, and their antirachitic effect. According to present knowledge, the vitamin D effect of both cow's and human milk is negligible, and the amount present in 1 litre of milk corresponds at best to 10-20% of the recommended amount, 10 µg vit. D₃/d = 400 IU/d, for nursing infants and growing children. The most important antirachitic sterols in both cow's and human milk are 25-hydroxyvitamin D

and vitamin D, which together account for over 90% of total activity. The share of 25-hydroxyvitamin D is greatest, about 75%. The remaining vitamin D effect of milk is connected to the vitamin D dihydroxymetabolites present. On the other hand, the water-soluble vitamin D compound, vitamin D-sulphate, does not, according to the most recent studies, have any effect on the anti-rachitic activity of milk. AA

- 2622 O'CONNOR (RE), EWINGS (KN) and HOLLYWOOD (NW). Effect of agitation on bacterial aggregates in pure cultures and raw milk. *J. Food Prot.* 46(8); 1983; 681-5

A comparison of the effects of various mechanical agitation treatments on bacterial aggregates was performed on 8 pure cultures and 27 raw milk samples. Although both syringing and blending produced significant increases in total counts and psychrotroph counts, blending for 2 minutes gave the greatest increase in count. Use of the direct epifluorescent filter technique (DEFT) confirmed that syringing and blending reduced bacterial clump size to approximately 2 cells. These agitation treatments markedly improved the correlation between DEFT counts and plate counts. AA

- 2623 LEDFORD (RA), SENYK (GF), KOTSIDES (E) and WOLFF (ET). Preliminary incubation method for detection of coliforms in commercially processed milk samples. *J. Dairy Sci.* 66(8); 1983; 1607-10

For detecting coliforms in processed milk samples, a procedure that involved an incubation procedure for samples for 6 hours at 37 C prior to plating on violet red bile agar and a large plate (150 mm d) method where 10 ml of milk was plated directly on violet red bile agar were employed. Data from 48 commercial samples (after storage for 1, 7 and 14 days at 6.7 C) revealed the presence of coliforms in 13, 58, 60 and 75 respectively, of the samples as evaluated by the red violet agar method. Presence of coliforms in 1-day samples was in 58, 75 and 67% of the samples respectively as assessed by large plate, preliminary incubation and most probable number methods. BSN

- 2624 LEDFORD (RA), SENYK (GF), SHIPE (WF), KOTSIDES (E) and WOLFF (ET). Influence of growth of coliforms on flavour acceptability of commercially processed milk samples. *J. Dairy Sci.* 66(8); 1983; 1611-5

Whole milk samples commercially processed for the last three years on analysis showed that by growth of coliforms, flavour acceptability was affected. Unacceptable flavour scores were observed in samples with 150 or greater colony forming units per ml by the violet bile agar method after 10 day storage at 6.7 C as assessed by trained panelists in 50, 70 and 72% of surveys in three years. By the preliminary incubation technique, 35 commercial samples found positive for coliforms were 0, 11, 57 and 91% at 1, 7, 10 and 14 days respectively. The preliminary incubation count on freshly processed milk was related to unacceptable flavour scores of 8, 33, 55 and 69% samples, which after 10 days showed counts of 0, 1-10, 11-100 and greater than 100 colony forming units/ml. Samples positive for coliform showed higher standard plate counts, rapid psychrotrophic counts, pyruvate contents, lipolysis and proteolysis than in coliform negative samples. BSN

- 2625 BUSH (B), SNOW (J), CONNOR (S), RUECKERT (L), HAN (Y), DYMERSKI (P) and HILKER (D). Mirex in human milk in upstate New York. *Arch. Environ. Contam. Toxicol.* 12(6); 1983; 739-46

- 2626 DEETH (HC). Homogenized milk and atherosclerotic disease: A review. *J. Dairy Sci.* 66(7); 1983; 1419-35

Discusses: hypothesis; xanthine oxidase - occurrence, properties, reactions; absorption of active xanthine oxidase; epidemiological considerations; clinical trials based on inhibition of xanthine oxidase, contention aspects and unresolved questions; homogenized milk in relation to other risk factors of atherosclerosis; and assessment of hypothesis. BSN

GHEE

- 2627 GUPTA (PS) and SIL (S). Detection of Phulwara butter (*Madhuca butyracea*) in ghee by TLC. *J. Assoc. Public. Anal.* 21(Part 1); 1983; 15-8
- A simple TLC method for detection 5% or more of Phulwara butter (*Madhuca butyracea*) in ghee has been reported. BSN

CHEESE

- 2628 SAN JOSE (C) and CASADO (E). Bibliometric analysis of cheese literature covered by the Food Science and Technology Abstracts in 1970 and 1980. *J. Dairy Sci.* 66(7); 1983; 1528-35
- 2629 HARDY (JJ) and STEINBERG (MP). Interaction between sodium chloride and paracasein as determined by water sorption. *J. Food Sci.* 49(1); 1984; 127-31, 136
- A model system (salt-paracasein-water) was studied for binding interactions influencing ripening of salted cheeses. Salt-protein interaction was calculated from water sorption data in the range 0.76-0.95 a_w . Data showed that the components did not behave independently i.e. more like paracasein and less like salt evidencing the salt-protein interaction. Added salt increased the interacting salt, reduced a_w , and moisture. For 0.85 a_w amount of interacted salt was found to be 0.08 g/g protein at salt addition of 0.30, out of which interacted salt was 0.11. MVG
- 2630 WHITE (CH) and RYAN (JM). Defining optimal conditions for making cottage cheese from reconstituted milk powder. *J. Food Prot.* 46(8); 1983; 686-9, 692
- 2631 HICKS (KB), RAUPP (DL) and SMITH (PW). Preparation and purification of lactulose from sweet cheese whey ultrafiltrate. *J. Agric. Food Chem.* 32(2); 1984; 288-92
- The paper describes procedures for the synthesis and HPLC analysis of lactulose from sweet cheese whey ultrafiltrate. Methods for the purification and crystallisation of the lactulose syrups, which included a boron selective procedure based on chromatography have been described. JVS

ICE CREAM

- 2632 THOMPSON (LU), RENIERS (DJ), BAKER (LM) and SIU (S). Succinylated whey protein concentrates in ice cream and instant puddings. *J. Dairy Sci.* 66(8); 1983; 1630-37
- Replacement of succinylated whey protein concentrate in place of non

fat dry milk in icecream and instant pudding increased viscosity and resistance to melting and reduced freezing time and over run. Further, hydration increased in instant pudding which was also accompanied by retarded rate of firming during storage. BSN

MEAT AND POULTRY

- 2633 LEE (K) and SHIMAOKA (JE). Forms of iron in meats cured with nitrite and erythorbate. *J. Food Sci.* 49(1); 1984; 284-5, 287
Solubility, valence, and complexation of iron were measured in four different processed meats cured with or without 156 ppm sodium nitrite and with or without 550 ppm sodium erythorbate (d-isoascorbate). Nitrite caused less ionic iron and erythorbate caused more ferrous and soluble iron after a conventional curing process. Heme iron levels were unchanged. No changes were detected in vacuum packed meats after 160 days at -40 or after 14 days at 5 C. Exposure to air at 5 C depleted ferrous iron and oxidized erythorbate. Boiling for 15 minutes doubled complexed iron in all four meat formulations. The forms of iron in processed meat depended on the curing ingredients as well as air and heat exposure. AA
- 2634 LOWRY (PD) and GILL (CO). Mould growth on meat at freezing temperatures. *Int. J. Refrig.* 7(2); 1984; 133-6
The review covers, forms of mould spoilage, limiting factors for growth at sub-zero temperatures, xerotolerance of meat-spoilage moulds, minimum growth temperatures, conditions for growth of meat spoilage moulds, and spoilage at -5 C. KAR
- 2635 WILLIAMS (RR), FARMER (CW), PARK (M), POKORNY (LA) and MICHAEL WEHR (H). Bacteriological evaluation of meat processor sanitation practices. *J. Food Prot.* 46(7); 1983; 605-9
Bacteriological evaluation of 111 meat processing establishments showed that the aerobic plate count (APC, 35 C), coliform and *Escherichia coli* and coagulase-positive *Staphylococcus aureus* was lowest for the processing units receiving greatest frequency of inspection. APC means for all equipment items were excessive in all cases examined. BSN
- 2636 PARRIS (N), PALUMBO (SA) and MONTVILLE (TJ). Evaluation of inosine monophosphate and hypoxanthine as indicators of bacterial growth in stored red meat. *J. Food Prot.* 46(7); 1983; 614-7
HPLC studies revealed that changes in inosine monophosphate (IMP) and hypoxanthine occurred during storage of beef at 5 C, due to result of activity of endogenous meat enzymes and not due to the presence of bacterial flora (*Pseudomonas fluorescens*). BSN
- 2637 KALAPOTHAKI (V), VASSILIADIS (P), MAVROMMATI (CH) and TRICHOPOULOS (D). Comparison of rappaport-vassiliadis enrichment medium and tetrathionate brilliant green broth for isolation of *Salmonella* from meat products. *J. Food Prot.* 46(7); 1983; 618-21
Salmonella in 533 samples of meat products was detected by employing Rappaport-vassiliadis enrichment medium (RV medium) and Difco's tetrathionate brilliant green broth (TBG). RV medium was found superior to TBG, concerning the number of positive samples (36% and 28% respectively), and also the number of *Salmonellae* serotypes and strains. RV medium inhibited the

lactose- and sucrose negative competing organisms more than TBG. The efficacy of brilliant green deoxycholate agar and bismuth sulphite agar was similar, either with enrichment with RV medium or any of the tetrathionate brilliant green broths. BSN

- 2638 CAMPBELL (DF), WORKMAN (MY), KRUMM (GW) and JOHNSTON (RW). Bacteriological survey of frozen meat ravioli produced at establishments under federal inspection. *J. Food Prot.* 46(8); 1983; 710-13, 716

BEEF

- 2639 SMITH (GC), BERRY (BW), LENNON (JH) and SAVELL (JW). Transoceanic shipment of chilled beef variety meats. *J. Food Prot.* 46(8); 1983; 728-30
- 2640 KAS (J), VANA (V), KOPECNY (J) and RAUCH (P). Stability of lysosomes in beef and pork muscle post mortem. *Z. Lebensmittel-Unters Forsch.* 177(6); 1983; 461-7

BOVINE

- 2641 KOOHMARAIE (M), KENNICK (WH), ANGLEMIER (AF), ELGASIM (EA) and JONES (TK). Effect of postmortem storage on cold-shortened bovine muscle: Analysis by SDS-polyacrylamide gel electrophoresis. *J. Food Sci.* 49(1); 1984; 290-91
- 2642 KOOHMARAIE (M), KENNICK (WH), ELGASIM (EA) and ANGLEMIER (AF). Effects of postmortem storage on muscle protein degradation: Analysis by SDS-polyacrylamide gel electrophoresis. *J. Food Sci.* 49(1); 1984; 292-3

PORK

- 2643 MAKRIOTT (NG), GRAHAM (PP) and BOVARD (KP). Comparison of restructured chops manufactured from prerigor and postrigor pork. *J. Food Prot.* 46(7); 1983; 589-91, 595
- 2644 OCKERMAN (HW) and SZCZAWINSKI (J). Effect of electrical stimulation of inoculated pork tissue on the thermoresistance of *Lactobacillus plantarum*, *Pseudomonas putrefaciens* and *Streptococcus faecalis*. *J. Food Sci.* 49(1); 1984; 288-9

Electrical stimulation caused an initial reduction in the pH of inoculated pork tissue (40 ± 10 g, M. sterno-cephalicus) but did not decrease the bacterial counts for the nonheated microorganisms. Under the conditions of this study, electrical stimulation did not affect the thermoresistance of *Streptococcus faecalis*, but slightly decreased the thermoresistance of *Lactobacillus plantarum* and *Pseudomonas putrefaciens*, which was not caused by the lowering of the pH of the heating media. AA

- 2645 CRENWELGE (DD), TERRELL (RN), DUTSON (TR), SMITH (GC) and CARPENTER (ZL). Effects of time postmortem of electrical stimulation and postmortem chilling method on pork quality and palatability traits. *J. Food Sci.* 49(1); 1984 294-5, 297

Twenty market hogs were used in this study to determine the effects of electrical stimulation (ES) administered at various times postmortem

(5, 15-20, or 30-40 minutes) and chilling treatment (Conventional = 24 hours at 0-2 C, or Rapid = 34 C for 3 hours then 0-2 C for 21 hours) on pork quality and palatability traits. The findings of this study indicated that ES of hog carcasses, particularly at 5 or 15-20 minutes postmortem, detrimentally affects quality by inducing a paler colour, reducing muscle firmness, and increasing muscle separation. Rapid chilling lessened these detrimental effects. Cooking loss, cooking time, shear force values, and palatability traits were not affected by ES or chilling rate. AA

- 2646 MOTTRAM (DS), CROFT (SE) and PATTERSON (RLS). Volatile components of cured and uncured pork: the role of nitrite and the formation of nitrogen compounds. *J. Sci. Food Agric.* 35(2); 1984; 233-9

A slice-curing method was used to prepare bacon and nitrite-free salt pork. Headspace volatiles from the cooked products, and from cooked untreated pork, were entrained on Tenax GC and analysed by combined gas chromatography-mass spectrometry. Aliphatic alcohols and aldehydes dominated the volatiles of all samples; small amounts of ketones, alkybenzenes, pyrazines, pyridines, thiazoles and furans were also present. Untreated pork and salt pork contained essentially the same volatiles, while the bacon showed a number of qualitative differences; several unsaturated and aromatic aldehydes were only present in nitrite free samples and benzonitrile, phenylacetoneitrile and four alkyl nitrates were found only in bacon volatiles. The possible origins of these nitrogen-compounds from the reaction of nitrite with flavour precursors are discussed. AA

- 2647 MOTTRAM (DS). Organic nitrates and nitriles in the volatiles of cooked cured pork. *J. Agric. Food Chem.* 32(2); 1984; 343-5

Headspace volatiles of cooked cured pork containing nitrite and nitrate residues showed the presence of benzonitrile, phenylacetoneitrile, and four alkyl nitrates. They were collected on Tenax GC and analysed by GC-MS. Samples with high residual nitrite levels showed several alkanenitriles. A volatile extract of bacon with high levels of nitrites also showed all these compounds. JVS

- 2648 RHEE (KS), SMITH (GC) and TERRELL (RN). Effect of reduction and replacement of sodium chloride on rancidity development in raw and cooked ground pork. *J. Food Prot.* 46(7); 1983; 578-81, 584

Ground pork (raw and cooked) was treated with NaCl, KCl or MgCl₂ at ionic strengths of either 0.70 or 0.35, and stored at 4 or -20 C. Regardless of storage temperature, NaCl and MgCl₂ increased rancidity of both raw and cooked samples, whereas KCl increased rancidity of raw samples only. In raw pork samples, NaCl increased rancidity the most. In cooked samples, MgCl₂ increased rancidity more than NaCl when samples were stored at 4 C, but the opposite was true for samples stored at -20 C. Discolouration was most severe for raw, frozen samples treated with NaCl. Replacement of NaCl with KCl was most effective for decreasing rancidity in both raw and cooked samples. AA

- 2649 HARRISON (N). The composition of fresh pork. *J. Assoc. Publ. Anal.* 21(part 2); 1983; 59-65

Data on major physico-chemical composition of certain cuts of fresh raw pork as used for the production of Wiltshire bacon have been presented. The problems associated with the limitations in the use of a single nitrogen factor for the estimation of lean meat in evaluating the curing solution content of bacon have been highlighted. BSN

- 2650 STABURSVIK (E), FRETHEIM (K) and FROYSTEIN (T). Myosin denaturation in pale, soft, and exudative (PSE) porcine muscle tissue as studied by differential scanning calorimetry. *J. Sci. Food Agric.* 35(2); 1984; 240-44

Myofibrillar tissue from pale, soft, and exudative (PSE) pork was compared to tissue from normal pork by differential scanning calorimetry at pH 5.4. Thermograms of myofibrillar tissue from normal pork were characterised by three major peaks with temperature maxima at 58 and 66 C, associated with myosin denaturation, and at 78 C, associated with actin denaturation. In thermograms of PSE pork, the peak at 58 C was markedly reduced, and appeared as a shoulder. When the thermograms were divided into segments corresponding to the three major peaks, the area of the low temperature myosin segment was shown to be reduced by about 50% in PSE pork, as compared to normal pork. This indicates approximately 50% denaturation of the least thermostable parts of the myosin molecule. The more thermostable parts of the myosin molecule were largely unaffected, as was actin. AA

- 2651 DRANSFIELD (E) and JONES (RCD). Texture and mechanical properties of pork backfat. *J. Food Technol.* 19(2): 1984; 181-96

A puncture test for measuring the firmness of backfat is described for use in studies of the effects of changes in animal production, and meat processing on the quality of fatty tissue. The operating and recording conditions were chosen from sensory deformation characteristics used in firmness evaluation when pressing fat with the index finger. On average, assessors exerted a maximum force of about 30 N and caused a deformation of 4 mm in 2 seconds and the best predictor of firmness was the maximum deformation they applied. Mechanical properties of the fats were determined by stress relaxation and the modulus 2.5 seconds after compression was about 80×10^4 for hard and $< 3 \times 10^4$ N/m² for soft fat at 3 C and the logarithm of the modulus was linearly related to the subjective firmness rating. In the puncture test, the forces required to drive a stainless steel punch (3.5 mm in diameter) 2.5 or 4.0 mm into backfat at 3 C at 2 mm/seconds correlated well ($r > 0.8$) with firmness rating and five replicate determinations using the punch proved more discriminating than a panel of four assessors. A combination of the forces required on inner and outer layers of fat accounted for 93% of variation in firmness assessments. AA

- 2652 MARRIOTT (NG), TRACY (JB), KELLY (RF) and GRAHAM (PP). Accelerated processing of boneless hams to dry-cured state. *J. Food Prot.* 46(8); 1983; 717-21

Three different cure mixtures were applied at the rate of 5% of the weight of fresh boneless hams before tumbling at 21 C for 3 hours continuously at 22 rpm. The hams were held 12 hours at 4.4 C for salt (NaCl) equalization, smoked for 4 hours cooked to an internal temperature of 71 C and aged for 14 days. Sensory evaluations were made and residual salt, moisture and nitrite (NO₂) were determined. Panel scores were similar for all treatments that were tumbled. Percentage salt and moisture were similar for the three treatments, but the control (non-tumbled) had the lowest concentration of NaCl and NO₂. Residual NO₂ levels for hams treated with 0.1 or 0.2% sodium nitrite (NaNO₂) were not different ($P > 0.05$). The highest NO₂ level was detected in hams cured with nitric oxide. AA

- 2653 GOUTEFONGEA (R). Influence of condensed phosphates on some characteristics of cooked ham: Effect of pH and water hardness. *Sci. Aliment.* 3(4); 1983; 513-26 (French)

The influence of polyphosphates and of water hardness on certain characteristics of Paris ham has been investigated. The technological yield was found to depend on the quality of the raw material and on the hardness of the water used to prepare the pickling solutions. It was also found that the hardness of water had no effect on the principal characteristics of the product, whatever pH-value of the meat, may have been, and whether or not polyphosphates had been used. The technological yield was improved by the condensed phosphates, due to the higher pH-value, and especially so when the raw meat had a high pH-value. The increase in yield was due to retention of both water and dry matter. The residual nitrite content was higher when the pH of the raw meat was high, and also when condensed phosphates had been added. KMD

- 2654 BERRY (BW), QUICK (JA), DOUGLASS (LW) and TENNENT (IN). Shelflife characteristics of bacon processed with various levels of sodium nitrite and potassium sorbate. *J. Food Prot.* 46(7); 1983; 596-600

Bacon processed without sodium nitrite showed more lean surface discolouration on storage under refrigerated dark conditions (0,2 and 4 days of simulated retail conditions following 10,30,50 and 70 days storage) as compared to those treated with 40 ppm sodium nitrite, 2600 ppm potassium sorbate and 120 ppm sodium nitrite treatments. Except for the plant which employed low salt-high sugar formulation, the amount of lean surface discolouration, presence of undesirable colours and off odour scores were similar between the 40 ppm sodium nitrite-potassium sorbate formulation and 120 ppm sodium nitrate dosage. BSN

RABBIT

- 2655 MERDADI (N), COTTIN (P), OUALI (A), OBLED (A), VALIN (C) and DUCASTAING (A). Comparative effects of two calcium-activated neutral proteinases on ATPase activities in rabbit skeletal muscle. Relationship with ageing phenomenon. *Sci. Aliment.* 3(4); 1983; 499-512

SAUSAGE

- 2656 KROLL (J) and GASSMANN (B). On the extension and the substitution of meat in sausages and other comminuted meat products. *Nahrung.* 27(7); 1983; 699-717 (German)
- 2657 NIELSEN (H-JS). Influence of temperature and gas permeability of packaging film on development and composition of microbial flora in vacuum-packed bologna-type sausage. *J. Food Prot.* 46(8); 1983; 693-8
- 2658 LOZANO (JR) and CASSENS (RG). Influence of an extract of heart on stability of colour and development of rancidity during storage of sliced bologna. *J. Food Sci.* 49(1); 1984; 149-51, 208

POULTRY

- 2659 DAVIES (AMC), GEE (MG) and GREY (TC). A preliminary evaluation of the super-scan meat analyser for the analysis of poultry meat. *J. Food Technol.* 19(2); 1984; 175-80

The Super-Scan meat analyser measures protein, fat and moisture on an homogenate of the sample by infrared absorption in the transmittance rather than the reflectance mode. A preliminary evaluation of the instrument using fifty-two samples of chicken or turkey meat indicated that the instrument gave reliable results for fat, but not for protein and moisture. Regression equations were obtained from the combined data and used to correct the protein and moisture results. These equations were tested on a further twenty-eight samples of turkey meat and the results obtained demonstrated that the instrument could be used for the rapid analysis of poultry meat. AA

- 2660 OOSTEROM (J), DE WILDE (GJA), DE BOER (E), DE BLAAUW (LH) and KARMAN (H). Survival of *Campylobacter jejuni* during poultry processing and pig slaughtering. *J. Food Prot.* 46(8); 1983; 702-6

BROILER

- 2661 HAMM (D) and ANG (CYW). Effect of sex and age on proximate analysis, cholesterol and selected vitamins in broiler breast meat. *J. Food Sci.* 49(1); 1984; 286-7

Breast meat was obtained from 7- through 12-week-old commercially reared broilers and analyzed. Proximate analyses values showed no differences due to sex or age of bird. Riboflavin values remained constant at about 0.09 mg/100 g raw flesh for the period studied. Vitamin B₆ values were higher than has been reported in literature (0.72-0.86 mg/100g range). Niacin values were only slightly higher than previously reported (11.7-13.3 mg/100g). Cholesterol values were lower than reported in the literature (31-54 mg/100g vs 58 mg/100 g). The 7- and 12-week values were near reported values, while the 9, 10 and 11-week values were definitely lower. AA

EGG

- 2662 MOHR (KH), BAUER (W) and FRITZSCHE (H). Possibilities of utilizing eggshells from industrial processing of eggs. *Lebensmittel-industrie.* 30(6); 1983; 255-6 (German)

Egg-shells, with their residual content of egg liquid, can be processed into a protein-rich mineral supplement for feeding poultry. The average composition of such a supplement, the laying performance and hence, calcium balance in birds receiving the supplement have been reported in tables. KMD

- 2663 SCUDAMORE-SMITH (PD). Egg pulp can corrosion during frozen storage. *Food Technol. Aust.* 35(4); 1983; 162-5

SEAFOODS

FISH

- 2664 POULTER (NH) and POULTER (JM). Composition of shrimp by-catch fish from the Gulf of California and effects on the qualities of the dried salt fish cake product. *J. Food Technol.* 19(2); 1984; 151-61
- The gross chemical and physical characteristics of a range of common fish species found in shrimp by-catch from the Gulf of California have been studied. These fish represented about 90% by weight of all fish species found in the by-catch. The crude protein, fat, moisture and ash contents were all found to be within the normal ranges for demersal teleosts, though fat contents of several were as high as 6%. The heterogenous nature of the by-catch fish species was also apparent from a wide range in lengths and weights, and variation in the colours and textures of their flesh. These factors may necessitate pre-selection of fish types destined for specific food products. Dried salt fish cakes were prepared from two of these fish species that had been manually and acid eviscerated. Cakes from acid eviscerated fish minces to which 10-15% crude salt had been added dried well and were found to be as acceptable in taste panel trials as those from manually eviscerated fish minces prepared in the traditional way with higher additions of crude salt. AA
- 2665 KARUBE (I), MATSUOKA (H), SUZUKI (S), WATANABE (E) and TOYAMA (K). Determination of fish freshness with an enzyme sensor system. *J. Agric. Food Chem.* 32(2); 1984; 314-9
- A definition of fish freshness is represented in this study by an equation based on the concentration of inosine 5'-phosphate, inosine and hypoxanthine. In order to determine these compounds, a combination of 5'-nucleotidase membrane and a nucleoside phosphorylase membrane with an oxygen electrode was used to serve as the enzyme sensor system. An ion exchange column was also used to separate nucleotides. JVS
- 2666 BARLOW (SM), COLLIER (GS), JURTIZ (JM), BURT (JR), OPSTVEDT (J) and MILLER (EL). Chemical and biological assay procedures for lysine in fish meals. *J. Sci. Food Agric.* 35(2); 1984; 154-64
- Chemical tests (total lysine, dye binding capacity dye binding lysine and reactive lysine) to determine the lysine content of 8 samples of fish meal were undertaken by 8 laboratories. The dye binding methods appeared to be suitable for process control within a fish meal factory where the nature of samples are known. JVS
- 2667 MILLER (SA) and BROWN (WD). Effectiveness of chlortetracycline in combination with potassium sorbate or tetrasodium ethylenediaminetetraacetate for preservation of vacuum packed rockfish fillets. *J. Food Sci.* 49(1); 1984; 188-91
- Results indicated that fish fillets dipped in 1% potassium sorbate along with 5 ppm CTC retained odour and flavour of fresh fillets better than those treated with EDTA/CTC after 14 days storage. MVG
- 2668 KOLAKOWSKA (A) and DEUTRY (J). Some comments on the usefulness of 2-thio-barbituric acid (TBA) test for the evaluation of rancidity in frozen fish. *Nahrung.* 27(5); 1983; 513-86

Rancidity of frozen fish (Baltic cod and herring, mackerel, horse mackerel and hake) was determined by means of TBA value, organoleptical scoring and peroxide value. The correlation between the rancid odour sensory assessment and TBA test results proved insignificant ($r = 0.53$). Model experiment was undertaken in which promine D with addition of papain was incubated at 50 C over 44 hours. It was shown that as accumulation of protein hydrolysis products proceeded, the increase of TBA value took place without development of rancid odour and with peroxide content below sensibility of sulphocyanide method. With regard to fish, therefore, it seems that the TBA test applied by means of techniques in which the reaction with TBA proceeds in the presence of interfering substances should be treated as a "freshness test" rather than a strictly rancidity one. AA

- 2669 GRAY (RJH), HOOVER (DG) and MUIR (AM). Attenuation of microbial growth on modified atmosphere-packaged fish. *J. Food Prot.* 46(7); 1983; 610-3
Four species of fish from Atlantic waters, *Meronia americanus* (perch), *Cynoscion regalis* (seatrout), *Micropogon undulatis* (croaker) and *Pomatomus saltatrix* (bluefish), were processed (gutted or filleted), packaged under carbon dioxide and refrigerated. Stability of the fish under the modified atmosphere preservation (MAP) system was compared to that of fish stored conventionally. Use of the MAP system resulted in a 45 to 55% increase in stability, primarily due to an extension in the lag phase of psychrotrophic organisms and to their reduced growth rate in the logarithmic phase. By the 10th day of storage, the conventionally packed fish always exhibited a 100-fold higher psychrotroph count than the CO₂-packed fish. Levels of *Vibrio parahaemolyticus* were negligible in this MAP system and no *Salmonella* spp. or *Staphylococcus aureus* was detected, even at an abuse temperature (10 C) of storage. Positive evidence for preformed *Clostridium botulinum* toxin was lacking. AA
- 2670 WATANABE (I), KASHIMOTO (T) and TATSUKAWA (R). Polybrominated anisoles in marine fish, shellfish, and sediments in Japan. *Arch. Environ. Contam. Toxicol.* 12(6); 1983; 615-20
- 2671 MALCOLM LOVE (R). Texture and the fragility of fish muscle cells. Research at the Torry research station. *J. Texture Stud.* 14(4); 1983; 323-52
Discusses: earlier techniques; cell fragility and its quantification; other homogenates and the study of texture; and texture and cell fragility in cold stored fish. BSN
- 2672 WEBER (O) and JUNGKUNZ (G). Contents of toxic metals, organo-chloro-pesticides and PCBs in fish caught from the Rednitz and Pegnitz rivers in the territory of Nuremberg city. *Dtsch Lebensmittel-Rundschau.* 79(10); 1983; 340-43 (German)
Eight species of fish - bream, carp, dace, eel, perch, pike, red-eye, and trout - caught in the Rednitz and Pegnitz rivers of S. Germany were analyzed for residues of pesticides and heavy metals. The contents of Hg, Pb, and Cd were found to be well below the permissible limits, and the same was true for the organo-chloro-pesticides, including DDT, BHC and HCH. KMD

HERRING

- 2673 KNOCHEL (S) and HUSS (HH). Ripening and spoilage of sugar salted herring with and without nitrate. 1. Microbiological and related changes. *J. Food Technol.* 19(2); 1984; 203-13
- 2674 KNOCHEL (S) and HUSS (HH). Ripening and spoilage of sugar salted herring with and without nitrate. II. Effect of nitrate. *J. Food Technol.* 19(2); 1984; 215-24

The technological effect of nitrate and the possible role of this compound in the formation of volatile nitrosamines during ripening and spoilage of sugar salted herring have been examined. In total, 600 barrels of fish with various amounts of nitrate added to the curing salt were prepared and stored under commercial conditions. During storage (18 months), the organoleptic, microbiological and chemical changes were studied. Additionally, a number of model experiments were carried out to evaluate the effect of nitrate on microbial growth and chemical changes. It was found that addition of nitrate significantly influenced the colour of the fish, while texture and flavour were not affected. Based on both the practical experiments and the model studies, it is concluded that nitrate *per se* does not inhibit any microbial growth. Growth of strict anaerobes does not occur until the substrate is depleted of TMAO, and nitrate is effective in delaying the most common type of spoilage by delaying the TMAO reduction. Small amounts of nitrosodimethylamine - up to 2.9 ppb has been detected - was formed in the sugar salted herring, but the addition of nitrate to the curing salt had no influence. AA

ANCHOVIES

- 2675 DEL VALLE (CE), FILSINGER (BE), YEANNES (MI) and SOULE (CL). Shelf-life of brine refrigerated anchovies (*Engraulis anchoita*) for canning. *J. Food Sci.* 49(1); 1984; 180-82

The possibility of keeping anchovies in brine at 0 C was studied. The storage life of anchovies under these conditions was about 85 hour. The concentration of brine seems to have little effect on the quality loss at the concentrations used in this study. An acceptability level for the raw material based on sensory attributes cannot be established with any degree of accuracy since the latter deteriorate slowly. Thiobarbituric acid number increased slightly over the initial value throughout this study. Total volatile base increased abruptly after 85 hours of storage. AA

ANTARCTIC FISH

- 2676 SUBRAMANIAN (BR), TANABE (S), HIDAKA (H) and TATSUKAWA (R). DDTs and PCB isomers and congeners in Antarctic fish. *Arch. Environ. Contam. Toxicol.* 12(6); 1983; 621-6

COD

- 2677 FREEMAN (HC), SANGALANG (GB), UTHE (JF), GARSIDE (ET) and DAYE (PG). A histopathological examination of, and analysis of polychlorinated hydrocarbons in, inshore Atlantic cod (*Gadus morhua*). *Arch. Environ. Contam. Toxicol.* 12(6); 1983; 627-32

In a sample of 100 live Atlantic cod (*Gadus morhua*) collected near the entrance of Halifax Harbour, Nova Scotia, in August 1980, 73% had histopathological lesions in their livers similar to those produced by toxicants such as polychlorinated hydrocarbons. These lesions were characterized by fatty degeneration and, in a few samples, desquamation of the epithelia of bile ducts. Of the 8% of the fish sample, all males and at the lower end of the size spectrum, had liver tissue with apparently normal parenchyma. The remaining 19% had early indications of pathologic alterations. The concentrations of several common polychlorinated hydrocarbons found in the environment were determined in the cod livers and there was no apparent concentration-histopathologic relationship. AA

EEL

- 2678 HU (CS) and KOBURGER (JA). Isolation of *Vibrio cholerae* from the American eel, *Anguilla rostrata*. *J. Food Prot.* 46(8); 1983; 731-2

HAKE

- 2679 HOLMQUIST (JF), BUCK (EM) and HULTIN (HO). Properties of kamaboko made from red hake (*Urophycis chuss*) fillets, mince, or surimi. *J. Food Sci.* 49(1); 1984; 192-8

FLOUNDER

- 2680 MONTECALVO (J) Jr., CONSTANTINIDES (SM) and YANG (CST). Optimization of processing parameters for the preparation of flounder frame protein product. *J. Food Sci.* 49(1); 1984; 172-6, 187

There is a high level of waste (50%) in the case flounder frame fish between the catch and processing, and efforts were made to make more efficient utilisation of this fish for protein production. Results showed that by optimizing pH, extraction medium, time and temperature, and volume to weight ratio, a high protein yield could be obtained. The technique could be applied to other under utilised fish. MVG

- 2681 FEINSTEIN (GR) and BUCK (EM). Relationship of texture to pH and collagen content of Yellowtail flounder and cusk. *J. Food Sci.* 49(1); 1984; 298-9

ARRIPIS TRUTTA

- 2682 BOYD (NS), WILSON (ND), JERRETT (AR) and HALL (BI). Effects of brain destruction on post-harvest muscle metabolism in the fish kahawai (*Arripis trutta*). *J. Food Sci.* 49(1); 1984; 177-9

CRAB

- 2683 AMAN (MB), MOUSTAFA (EK), ZOUEIL (ME) and GHALY (MH). Effect of ice and cold storage on the chemical and technological characteristics of Egyptian crab meat. *J. Food Technol.* 19(2); 1984; 141-9

Effect of ice and cold storage at 4 C on the chemical and technological characteristics of one of red local Egyptian crab (*Carcinus meanas*) has been studied. Such studies involved the determinations of: pH values, moisture, total nitrogen, protein nitrogen, ether extract, acid value, thiobarbituric acid value (TBA) and total bacterial count (TC). It has been found that the shelf life of ice stored crabs was 2 days. Raw crabs stored at 4 C can be kept without any deterioration for 8 days. Dipping of raw crab in 20 ppm chlorotetracycline (CTC) for 20 minutes raised the keeping period at 4 C up to 11 days. Cooked crabs can be stored at 4 C without any spoilage for 14 days. However, dipping of cooked crabs in 20 ppm of CTC for 20 minutes increased the keeping period to 17 days. AA

SHRIMP

- 2684 ZUBERI (R), QADRI (RB) and SIDDIQUI (PMA). Influence of processing on bacteriological quality of frozen shrimp. *J. Food Prot.* 46(7); 1983; 572-7

Line and finished product sample (668) from two shrimp processing plants from Karachi were examined bacteriologically. Bacterial profile of frozen shrimp samples (100) from plant A was: total aerobic plate count 9.4×10^6 CFU/g; MPN coliforms 94/g; and MPN fecal coliforms 41/g. 114 frozen samples from plant B showed the bacterial profile as: 8.3×10^6 CFU/g; 180/g; and 133 for total plate count; MPN coliform and MPN fecal coliforms, respectively. Of the 338 samples from plant B, three showed the presence of *Salmonella*. Plant A and plant B samples showed almost the same microflora for both the prawn species. As processing conditions of plant A were better than plant B, better quality end products came out of plant B. *Pseudomonads* were preponderant, followed by *micrococcus* sp. Bacterial profile of laboratory processed (under good sanitary conditions) shrimp showed total aerobic plate count of 8.1×10^5 CFU/g and coliform and fecal coliform MPNs were < 3 /g. BSN

- 2685 DURAN (AP), WENTZ (BA), LANIER (JM), McCLURE (FD), SCHWAB (AH), SWARTZEN-TRUBER (A), BARNARD (RJ) and READ (RB) Jr. Microbiological quality of breaded shrimp during processing. *J. Food Prot.* 46(11); 1983; 974-7

Duplicate samples of shrimp or breading materials were collected four times a day for two consecutive days at 12 locations along the processing lines of 33 shrimp-breading firms in the United States during 63 inspections. All firms were using good manufacturing practices. For stock shrimp, the geometric mean aerobic plate count at 35 C incubation (APC 35) was reduced from 2.1×10^6 to 3.3×10^5 colony-forming units (CFU)/g for the frozen finished product. At 35 C, an APC 35 of $\leq 10^6$ CFU/g was found for 78% of the finished samples. At 30 C incubation, the mean APC was reduced from 7.8×10^6 CFU/g for the stock shrimp to 7.6×10^5 CFU/g for the finished product. Coliform mean counts were virtually static (64 to 83/g) up to the batter-breading steps; however, these counts reached 148 to 160/g at the first batter-breading step and remained constant until the breaded shrimp were frozen. Mean *Escherichia coli* and *Staphylococcus aureus* counts were ≤ 3 and ≤ 10 /g, respectively, for all 12 in-line sampling locations. *Salmonella* organisms were found in one of 118 finished product samples tested for this pathogen. AA

- 2686 TONOGAI (Y), KINGKATE (A) and HALILAMIAN (C). Quantitative determination of colorants in dried shrimp and shrimp paste using ion-exchange extraction and high performance liquid chromatography. *J. Food Prot.* 46(7); 1983; 592-5

HPLC technique for extraction of colourants from proteinaceous foods (dried shrimp and shrimp paste) consists of liquid-liquid partition with the aid of a liquid anion exchange resin (Amberlite LA-2) after elution with ethanol-ammonia mixture from the sample, reextraction of colours released from the resin longer into an aqueous solution and the final HPLC estimation using a reverse phase partition type column (Zorbau C₈) and ammonium acetate. Recovery values obtained were more than 62% for colour at 100 ppm and more than 76.0% for colour at 1,000 ppm. BSN

- 2687 BRADSHAW (JG), SHAH (DB), WEHBY (AJ), PEELER (JT) and TWEDT (RM). Thermal inactivation of the Kanagawa hemolysin of *Vibrio parahaemolyticus* in buffer and shrimp. *J. Food Sci.* 49(1); 1984; 183-7

A semipurified thermostable direct hemolysin (Kanagawa hemolysin) was prepared from a clinical isolate of *Vibrio parahaemolyticus* (strain 533-72). Preliminary experiments determined that the hemolytic activity and mouse lethality of the hemolysin were inactivated at the same rate, that the rate was linear, and that the pH range of optimum thermal stability was pH 5.5-6.5. When approximately 256 rat erythrocyte units/g of Kanagawa hemolysin were heated at 115, 120, 125, and 130 C D values ranged from 46.5-13 minutes ($z_c = 27$ C) in Tris buffer and 48.1-10.4 minutes ($z_c = 23.2$ C) in shrimp homogenate, both at pH 7.0. AA

PROTEIN FOODS

Nil

FRUIT JUICES AND BEVERAGES

SOFT DRINK

- 2688 KAUFMAN (VR) and GARTI (N). Effect of cloudy agents on the stability and opacity of cloudy emulsions for soft drinks. *J. Food Technol.* 19(2); 1984; 255-61

Droplets with different sizes scatter light at different wavelengths. A droplet size index (R) was developed for predicting emulsion stability and absorbance of light at 660 nm was used to evaluate the opacity of the system. Various cloudy agents were tested on both stability and cloudiness of emulsions. The presence of emulsifiers and gums affected both the stability and opacity. Best conditions for high stability and opacity were found using combinations of ester gums and emulsifiers. AA

GRAPE JUICE

- 2689 SISTRUNK (WA) and MORRIS (JR). Changes in muscadine grape juice quality during cold stabilization and storage of bottled juice. *J. Food Sci.* 49(1); 1984; 239-42, 245

Effects of adding sugar, water and CaCO_3 , cold stabilisation, and storage temperature and time on quality attributes were studied. Cold stabilisation for 7 days was sufficient to remove much of the acidity without significantly affecting quality. Water addition upto 40% improved juice quality as it reduced phenols and acidity. Added sugar (3%) also improved quality. Addition of CaCO_3 was not beneficial as though it reduced acidity, it affected flavour and colour after storage. Browning was affected by neither addition of water nor by CaCO_3 . Adding water and/or sugar gave the best quality juice. MVG

CITRUS JUICE

- 2690 COHEN (E). Multiple linear regression modeling for quality control of citrus juice. *Z. Lebensmittel-unters. Forsch.* 177(6); 1983; 468-71

Multiple linear regression is a very useful and helpful technique for prediction, but can also lead to serious errors if improperly used and interpreted. Some of the techniques for selecting the "best" regression model are utilized for quality control of citrus juice. General references and guidelines for statistical/mathematical modeling are available. The main steps essential in any case are as follows: definition of the problem; statistical/mathematical model formulation (the exact mathematical relationship between the variables); data collection; and verification of the model. Building a statistical mathematical model based on multiple linear regression for quality control of citrus juice is discussed in this article. AA

ORANGE JUICE

- 2691 WEIHE (JL), SEIBT (SL) and HATCHER (JR).Jr. Estimation of microbial populations in frozen concentrated orange juice using automated impedance measurements. *J. Food Sci.* 49(1); 1984; 243-5

The technique was applied to several orange juice isolates with cut-off times of 10.2 hours and 15.8 hours for bacteria and yeast respectively, to classify them as acceptable or unacceptable. More than 96% samples could be correctly classified. The technique had several advantages like lower cost and lesser time for analysis and for giving reliable results. MVG

- 2692 ROSENBERG (M), KOPELMAN (IJ) and MANNHEIM (CH). Purification of citrus peel pigment preparate by gel permeation chromatography. *Food Sci. + Technol.* 17(5); 1983; 282-4

When a pigment, extracted from citrus peel by d-limonene, was used to colour orange juices, a strong off-flavour was produced in the fortified juice. The off-flavour problem was solved by cleaning up the crude pigment preparate, prior to its addition to the juice, by gel permeation chromatography on a Sephadex LH20 column, with ethanol as the eluant. In this way, about 370 mg of a purified, highly-coloured, carotenoid preparate was recovered from 1 kg of Valencia orange peels. About 400 ppm of the purified pigment was needed to improve the colour of undergrade A shamouti juice, to USDA grade A, with a score of 40 points. KMD

APPLE JUICE

- 2693 SHEU (MJ) and WILEY (RC). Influence of reverse osmosis on sugar retention in apple juice concentration. *J. Food Sci.* 49(1); 1984; 304-5
- Reverse osmosis (RO) concentration of apple juices from 10-20 Brix using a commercial plate and frame RO system at various temperatures and pressures demonstrated that high resistance (HR) membranes are more efficient in sugar retention than cellulose acetate (CA) membranes. Both temperature and pressure had a significant effect on solute recovery. Optimum processing conditions for HR membranes were 40 C at 40 bar, 98% sugar recovery and 16.7 L/m²/hr average processing capacity (flux). An increase of 3-4% average processing capacity per 1 C increase in temperature was observed. Operating conditions and membranes did not modify fructose content or glucose/fructose ratio of the RO concentrated juices. AA

CROWBERRY JUICE

- 2694 LINKO (R), KARPPA (J), KALLIO (H) and AHTONEN (S). Anthocyanin contents of crowberry and crowberry juice. *Food Sci. + Technol.* 16(6); 1983; 343-5
- Anthocyanin contents of northern and southern crowberry (*Empetrum nigrum* Coll.) were compared. The contents, calculated on the fresh weight basis, varied from 300 to 420 and from 350 to 560 mg/100 g in northern crowberry and in southern crowberry, respectively. The observed variations are at least partly due to the differences in weather conditions during the growth season. The effects of pectinases on the quality of crowberry juice was also investigated. While the heat treatment alone increased the colour yield by 44-49%, the improvement achieved by pectinases was small, 3-17%. The inefficacy of pectinase treatment agrees with the low content of pectic substances in crowberry. The refractometric dry weight in the press juice was increased by heat and pectinase treatments, whereas their effects on press yield and pH of the juice were minimal. AA

COCOA

- 2695 ZIEGLER (G) and SANDMEIER (D). Determining roasting degree of cocoa by means of high pressure liquid chromatography. *Dtsch. Lebensmittel-Rundschau.* 79(10); 1983; 343-7 (German)
- Water vapour distillates of cocoa are analyzed by means of HPLC. The chromatograph, with a detector wavelength of 280 nm, makes it possible to detect mainly methylized pyrazines. Concentration ratios between individual pyrazines correlate with the sensorially perceptible roasting degree of cocoa. This correlation applies independently, to a large degree of the cocoa's origin and processing stage. The method seems suited for industrial quality inspection. AA
- 2696 PASSOS (FML), SILVA (DO), LOPEZ (A), FERREIRA (CLLF) and GUIMARAES (WV). Characterization and distribution of lactic acid bacteria from traditional cocoa bean fermentations in Bahia. *J. Food Sci.* 49(1); 1984; 205-8
- Cocoa beans fermented by the traditional methods used in Brazil were studied for *Lactobacillaceae* and *Streptococcaceae*. It was observed that bacteria could be better established than yeasts during the first 48 hours.

Eight homolactic species and two heterolactic species were identified and were found better distributed. One thermophile was also present and constituted 26% of population at 16.8 hour. MVG

- 2697 CRAIG (WJ) and NGUYEN (TT). Caffeine and theobromine levels in cocoa and carob products. *J. Food Sci.* 49(1); 1984; 302-3, 305

It was found that mean theobromine and caffeine levels as measured by HPLC varied widely among the cocoa and chocolate, and carob products tested; the carob products contained substantially less caffeine than most of the chocolate products. MVG

- 2698 PAYNE (WL), DURAN (AP), LANIER (JM), SCHWAB (AH), READ (RB), Jr., WENTZ (BA) and BARNARD (RJ). Microbiological quality of cocoa powder, dry instant chocolate drink mix, dry nondairy coffee creamer and frozen nondairy topping obtained at retail markets. *J. Food Prot.* 46(8); 1983; 733-6

Data collected from a national survey conducted on microbiological quality of three dry beverage ingredients and one frozen dairy topping revealed the geometric aerobic plate counts at 35 C as follows: 1,313 units of cocoa powder, 6600 CFU/g; 1,552 units of dry instant chocolate drink mix, 290 CFU/g; 1,559 units of dry non dairy coffee creamer, 37 CFU/g; and 1,532 units of frozen non dairy topping, 34 CFU/g. For *Escherichia coli* and coliform bacteria, geometric mean values for most probable number determinations; were < 3/g for these products. *Staphylococcus aureus* showed geometric mean values were < 10/g. For yeasts and moulds in dry instant chocolate drink mix and dry non dairy coffee creamer, geometric mean values were 8 and 6 CFU/g respectively. BSN

COFFEE

- 2699 REYNOLDS (SL), THORPE (SA) and WOOD (R). The determination of the insoluble matter content of instant coffee: A collaborative trial. *J. Assoc. Publ. Anal.* 21(part 2); 1983; 47-52

The collaborative trial technique is based on a gravimetric procedure having a filter disc of specified characteristics for use in samples of instant coffee having more than 500 mg/kg of insoluble matter. BSN

- 2700 DEWS (P), GRICE (HC), NEIMS (A), WILSON (J) and WURTMAN (R). Report of Fourth International Caffeine Workshop, Athens, 1982. *Food Chem. Toxicol.* 22(2); 1984; 163-9

Digests of the papers relating to kinetics and metabolism carcinogenic and mutagenic potential, behavioural effects and neurological, pharmacological; and reproductive effects of caffeine are provided. JVS

- 2701 COLLINS (TFX), WELSH (JJ), BLACK (TN) and RUGGLES (DI). A study of the teratogenic potential of caffeine ingested in drinking water. *Food Chem. Toxicol.* 21(6); 1983; 763-77

Caffeine dissolved in drinking-water was available *ad lib.* to Osborne-Mendel rats at dose levels of 0, 0.007, 0.018, 0.036, 0.07, 0.10, 0.15 or 0.20% during days 0-20 of gestation. The corresponding daily caffeine intake were 0, 10.1, 27.4, 50.7, 86.6, 115.8, 160.9 and 204.5 mg/kg body weight. Dosages of 160.9 and 204.5 mg/kg were associated with decreased implantation efficiency, increased resorptions and decreased mean numbers of viable fetuses. Numbers of runts were significantly increased after dosages of

115.8-204.5 mg/kg/day. Foetal body weight and length were decreased and oedematous fetuses were increased at dosages of 86.6-204.5 mg/kg/day. Contrary to results seen after gavage studies, caffeine available *ad lib.* in drinking-water produced no dose-related gross anomalies. Only two animals with missing or hypoplastic nails were produced, both in the 160.9-mg/kg group. Sternebral ossification deficiencies were increased at all dose levels except 10.1 mg/kg/day. Skeletal ossification deficiencies were increased in a dose-related manner at the four highest dose levels. Caffeine given by water bottle produced ossification deficiencies similar to those seen after intubation, but at higher dosages. AA

WINE

- 2702 GORANOV (N). Influence of aroma substances on the quality of wines and spirits. *Nahrung* 27(5); 1983; 497-503 (German)

The influence of technological and other factors such as yeast strain, guidance of fermentation and storage on the quality of Bulgarian wines and wine distillates was investigated with the help of sensory, chemical-analytical and chromatographical methods. The total content of aldehydes, higher alcohols or esters or the total content of volatile components estimated by GC seem to be less suitable as quality index, whereas the ratio of esters to aldehydes and the ratio of isobutanol to isoamyl alcohol are parallel to a good sensory quality. The ester content of wines increases during storage, especially in casks. With wine distillates there is a good correlation between the time of storage and the content of aromatic aldehydes. AA

- 2703 HANDSON (PD). Lead and arsenic levels in wines produced from vineyards where lead arsenate sprays are used for caterpillar control. *J. Sci. Food Agric.* 35(1); 1984; 215-8

Twenty-seven dry table wines from 14 wineries throughout Victoria were analysed for lead and arsenic. Wines originating from vineyards using lead arsenate insecticide for caterpillar control had mean levels of 0.31 mg litre⁻¹ lead and 0.08 mg litre⁻¹ arsenic. The mean levels in similar wines from wineries not using lead arsenate sprays were 0.03 mg litre⁻¹ and less than 0.01 mg litre⁻¹ respectively. AA

- 2704 GORINSTEIN (S), GOLDBLUM (A), KITOV (S) and DEUTSCH (J). Fermentation and post-fermentation changes in Israeli wines. *J. Food Sci.* 49(1); 1984; 251-6

The changes occurring in minerals (Na, K, Ca), heavy metals (Cu, Fe) total amine N, free and bound amino acids, colour, arginine/acids and glycerol during and after fermentation could be used as possible indicators of fermentation rates and wine stability. Similarly, spectral identification and gas-liquid chromatographic profiles could also be used. There were significant correlation between Ca and glycerol, Ca and tartaric acid. There was, however, a lower correlation between tartaric acid, Ca and glycerol and the number of days in most samples. The wines were rich in proline, glutamic and aspartic acids and arginine in their free and bound forms. MVG

- 2705 MESROB (B), GORINOVA (N) and TZAKOV (D). Characterization of the electrical properties and of the molecular weights of the proteins of white wines. *Nahrung* 27(8); 1983; 727-34 (German)

- 2706 MORET (I), DILEO (F), GIROMINI (G) and SCARPONI (G). Multiple discriminant analysis in the analytical differentiation of Venetian white wines. 4. Application to several vintage years, and comparison with the K nearest-neighbour classification. *J. Agric. Food Chem.* 32(2); 1984; 329-333

Venetian white wines (53 samples) obtained from vintages of 1980 and 1981 have been analysed for quality. The multiple discriminant analysis was carried out using all data and the outcome of classification together with the estimated of actual error rate are reported. The data set was processed by the nonparametric classification rule of K nearest neighbours (kNN). JVS

- 2707 MAUJEAN (A) and SEGUIN (Nadine). Sunlight flavours in champagne wines. 3. Photochemical reactions responsible for sunlight flavours in champagne wine. 4. Study of an oenological solution to prevent sunlight flavour. *Sci. Aliment.* 3(4); 1983; 589-601 and 603-613 (French)

It is demonstrated that the "tastes of light" are due to degradative photo-oxidation of the sulphur-containing aminoacids, naturally present in Champagne wine. The reaction is photosensitized by vitamin B₂. The latter, which is photo-reactive in its triplett state, is found in a reduced form after the reaction. The primary reaction product is methanol which, in its turn, is degraded photochemically and chemically into methane-thiol and methyl disulphide, which are the volatile, sulphur compounds responsible for the "taste of light". The need to find an oenological solution for any accidental "taste of light" in Champagne wines made the authors test three types of preventive additives, which were assumed to be compatible with the photochemical, chemical, legislative, technological, and organoleptic imperatives. While one may expect, a priori, a great preventive and curative efficacy in the cupric ion, it has been proved that the real efficacy of this cation is limited. Moreover, the first results have revealed that the dithionite ions and tannins show an efficacy which deserves to be confirmed by trials on an industrial scale. KMD

- 2708 LUTHY (J) and SCHLATTER (C). Biogenic amines in foods: Effects of histamine tyramine and phenylethylamine on man. *Z. Lebensmittel-Unters Forsch.* 177(6) 1983; 439-443 (German)

The effect of 25 mg histamine, 25 mg tyramine and 5 mg phenylethylamine respectively in apple juice on 27 healthy volunteers was studied using a randomized placebo-controlled double-blind procedure. No statistically significant effect was found with histamine and tyramine, but phenylethylamine produced symptoms like headache, dizziness and discomfort in some volunteers. In a second experiment, the effect of four different wines (2 dl) containing naturally several biogenic amines in various amounts (histamine n.d. - 21 ppm; tyramine 1-23 ppm; phenylethylamine n.d. - 6 ppm; putrescine 2-55 ppm) on 20 volunteers was recorded. The percentage of volunteers experiencing symptoms was of the same order of magnitude as in the first experiment. No correlation was found to exist in this second experiment between the occurrence of symptoms and the concentration of biogenic amines in the wine samples. AA

BEER

- 2709 HUGGINS (JD). Multi-material recycling: An all-industry concept. *Brew. Dig.* 58(7); 1983; 26-9

- 2710 GORINSTEIN (S), KITOV (S), BERLINER (M), DUNCAN (J), PHILLIPS (A), QUICKE (G), BAYLY (FC) and LOUBSER (GJ). Enzyme-related changes in the nutritional value of beer. *Brew. Dig.* 58(7); 1983; 20-23

- 2711 ROBBERECHT (H), VAN SCHOOR (O) and DEELSTRA (H). Selenium and chromium content of European beers as determined by AAS. *J. Food Sci.* 49(1); 1984; 300-301

Seventy four brands of beer were screened by atomic absorption spectrometry. Chromium (Cr) in selected beers ranged from less than 0.2 to 4.6 ng/ml while Selenium (Se) varied from 0.2 to 15.2 ng/ml. On calculation of dietary intake of both elements (*via* beer) in Belgium, it was found Cr accounted for 5% and Se for less than 1%. There was no definite correlation between Cr and Se concentration and type of fermentation; no relationship also existed between Cr and Se contents. MVG

- 2712 FRITZ (W). Formation of cancerogenic hydrocarbons during the heat treatment of foods - Investigations on the formation of cancerogenic hydrocarbons during kiln-drying, and their content in beer. *Lebensmittel-industrie.* 30(5); 1983; 209-11 (German)

Polycyclic aromatic hydrocarbons (PAH) - which are known to be carcinogenic - may be formed in malt during kiln-drying. Indirectly, dried malts have the lowest content of PAH, while the highest values are found in malts dried directly over high-temperature lignite coke, for the longest time. The PAH content of malt goes over into the beer during brewing. The content of benzapyrene (BaP) in brewing malt is 0.9-10.7 g/kg, while in beer it is 0.01-0.2 µg/kg. Assuming the average BaP content of beer to be 0.08 µg/kg, the per capital intake of BaP through beer would be about 10.4 µg/year in E. Germany. The total BaP intake through foodstuffs amounts to about 0.2-1.0 mg BaP/caput/year. KMD

- 2713 HEIDRICH (G) and DOBLER (H). Hydrothermal treatment and grinding of barley and malt for brewing. *Lebensmittel-industrie.* 30(5); 1983; 212-4 (German)

Brushing tests were conducted with hydrothermally prepared raw materials in double break rolls. The composition of the grits and the spelt volume can be favourably influenced by a suitable selection of conditioning and grinding parameters (increase of grain moisture, fluting and ratio of the rolls, gap between the rolls, etc.). The grits so produced can help to reduce lentering (clarification) time and increase the yield of extract. KMD

OILS AND FATS

OILS

- 2714 GORA (J) and BRUD (W). Progress in synthesis of sensory important trace components of essential oils and natural flavours. *Nahrung.* 27(5); 1983; 413-28

In this paper, the role of sensory important trace components will be discussed. A chemical classification of the components is given as well as a review of methods of synthesis of the following substances applied in industry: cis-3-hexen-1-ol, rose oxide, alpha and beta-damascenone and damascone, theaspirone, raspberry ketone, pyranones, furanones and related products, alkylmethoxypyrazines, sulphur containing flavour substances. AA

- 2715 NASIRULLAH, MALLIKA (T), KRISHNAMURTHY (MN) and KAPUR (OP). Comparative study of the methods available for the detection of argemone oil in edible vegetable oils. *Indian Food Packer*. 38(2); 1984; 28-31

A comparative study of the existing ferric chloride methods like classical ferric chloride, modified ferric chloride, where toluene solution of the oil is used for extraction, and chromatographic method (paper and thin layer) for the detection of argemone oil in edible oils is described. HCl extraction of alkaloid sanguinarine and dihydrosanguinarine was found to be effective, by taking the oil in toluene. The sensitivity was 0.025%. Modifications are suggested to chromatographic methods for extraction and work up procedure; by TLC the lowest concentration argemone oil that could be visualised was 0.02%. KAR

- 2716 GARDNER (AM), YURAWECZ (MP), CUNNINGHAM (WC), DIACHENKO (GW), MAZZOLA (EP) and BRUMLEY (WC). Isolation and identification of C16 and C18 fatty acid esters of chloropropanediol in adulterated Spanish cooking oils. *Bull. Environ. Contam. Toxicol.* 31(6); 1983; 625-30

Three Spanish cooking oils adulterated with rapeseed oil containing aniline were analyzed for industrial chemicals, pesticides and trace metals. By neutron activation analysis, elevated levels up to 440 ppm were observed. Only a small fraction of this could be accounted for by GC with Hall. halogen selective detection. The method of isolation and identification of C16 and C18 fatty monoacid esters and diesters of chloropropanediol has been described. BSN

- 2717 SCHAFER (R), PIETZSCH (H-P) and HUBNER (D). On the enzymatic analysis of the content of polyenoic fatty acids in margarine and edible oil, and in selected fatty foods. *Lebensmittel-industrie*. 30(5); 1983; 220-22 (German)

An enzymatic method, using lipodixase, was employed to determine the content of polyenoic acids in two kinds of margarine and in other edible fats rich in polyenoic acids. The polyenoic acid content did not decline when these products were stored for their quaranteed shelf-life period. KMD

- 2718 MAHFOUZ (MM) and OSMAN (MY). Evaluation of trans and essential fatty acid content in some Egyptian consumer-available hydrogenated fats. *Fette Seifen Anstrichm.* 85(7); 1983; 283-8

The fatty acid composition of cottonseed and corn oils was determined before and after the technological hydrogenation process. In hydrogenated cottonseed and corn oils, the essential fatty acid content (linoleic, 18:2 ω^6) was decreased, while the trans-18:1 acid was increased as compared to the native oils. The trans as well as the essential fatty acid contents in some consumer-available hydrogenated fats were evaluated. The composition of cis and trans monoene isomers were also determined. This study revealed that some of the Egyptian consumer-available hydrogenated fats contain considerable amounts of trans acids. AA

COTTONSEED OIL

- 2719 RAIE (MY), AHMAD (M), AHMAD (I), KHAN (SA) and ATHAR JAFRI (SA). Chromatographic studies of cottonseed oils. *Fette Seifen Anstrichm.* 85(7); 1983; 279-80

Eight varieties of cottonseed cultivated in Pakistan have been studied. These contain 11.6-24.0% oil and their fatty acid composition as determined

by G.L.C. is C_{14:0} (0.7-2.0%), C_{14:1} (0-0.3%), C_{16:0} (28.3-43.1%), C_{16:1} (0.3-2.7%), C_{18:0} (0.3-8.5%), C_{18:1} (16.2-32.0%), C_{18:2} (31.3-41.2%) and C_{20:0} (0.2-0.3%). AA

GROUNDNUT OIL

- 2720 TREADWELL (K), YOUNG (CT) and WYNNE (JC). Evaluation of fatty acid content of forty peanut cultivars. *Oleagineux*. 38(6); 1983; 381-6

The fatty acid compositions of 38 peanut (*Arachis hypogaea* L.) cultivars, and of 2 wild species (*A. monticola* and *A. nanbyquarae*) have been determined by gas-liquid chromatography. The 38 cultivars included samples of the varieties "Virginia", "Hirsuta", "Spanish" and "Valencia". Emphasis was laid on accurate measurement of the long-chain, saturated fatty acids, which have been implicated in the surprisingly high atherogenicity of peanut oil. The contents of different long-chain fatty acids fell within the following ranges: C_{20:0}, 1.02-1.63%; C_{22:0}, 2.43-3.97%; and C_{24:0}, 1.41-2.52%. KMD

MUSTARD SEED OIL

- 2721 MUKHOPADHYAY (S) and BHATTACHARYYA (DK). Colorimetric estimation of allyl isothiocyanate content in mustard and rapeseed oils. *Fette Seifen Anstrichm.* 85(8); 1983; 309-11

A colorimetric method based on the colour reaction between allyl thiourea and potassium ferricyanide solution in dilute acetic acid has been developed for the determination of allyl isothiocyanate content in mustard and rapeseed oils. The method measures the optical density of the colour complex at 600 nm and it works in the range 2.5 to 7.5 µg of allyl isothiocyanate per ml of the colour solution. Mustard and rape oil samples analysed contain 0.40 to 0.6% of allyl isothiocyanate, with standard deviation of 0.002 to 0.016. The method takes around 3 hours and permits a number of sample analysis at a time. AA

RAPSEED OIL

- 2722 PURI (PS) and De MAN (JM). Hydrogenation of low erucic acid rapeseed oil. *Fette Seifen Anstrichm.* 85(3); 1983; 99-105

SOYABEAN OIL

- 2723 JAWAD (IM), KOCHHAR (SP) and HUDSON (BJF). The physical refining of edible oils. 1. Effect on component fatty acids and on triglycerides. *Food Sci. + Technol.* 17(5); 1983; 289-93

In the course of physical refining (steam refining) of soyabean oil for periods of half to three hours at temperatures of 240-300 C chemical changes take place which are a function of time and temperature. Polyunsaturated acids are partly isomerised to trans and conjugated isomers and may also be polymerised to a significant extent. Interesterification of the triglycerides takes place progressively and the overall triglyceride composition changes through a fall in C54 triglycerides. AA

SUNFLOWER OIL

- 2724 JAKY (M). Investigations on the fatty acid composition of sunflower oil. *Ernährungsforschung*. 28(5); 1983; 142-4 (German)

A detailed examination of the fatty acid and triglyceride composition of various kinds of sunflower oil has been undertaken, and compared with an "idealized" fatty acid composition, in order to find some sort of guidelines for future work in sunflower breeding. The plant already has the tendency to place 72-80% of the linoleic acid in its seed oil in the favourable β -position of the triglyceride. KMD

- 2725 ROBERTSON (JA) and WINDHAM (WR). Automatic Karl Fischer titration of moisture in sunflower seed. *J. Am. Oil Chem. Soc.* 60(10); 1983; 1773-7

- 2726 YUNGINGER (JW), GAUERKE (MB), JONES (RT), DAHLBERG (MJE) and ACKERMAN (SJ). Use of radioimmunoassay to determine the nature, quantity and source of allergenic contamination of sunflower butter. *J. Food Prot.* 46(7); 1983; 625-8

In six out of eight sunflower butter samples, peanut butter contamination from 0.3-3.3% was observed, including both creamy and chunky varieties and lots prepared with either peanut oil or palm oil. BSN

JOJOBA OIL

- 2727 MARTIN (G). Reflections on oil crops as sources of energy. I. Jojoba (*Simmondsia chinensis*), a lubricant of the future. *Oleagineux*. 38(6); 1983; 387-92 (French)

PALM OIL

- 2728 RUTKOWSKI (A). Traditional palm oil processing in Western Africa. *Fette Seifen Anstrichm.* 85(7); 1983; 262-7

Palm oil is processed in the African countries in 70 to 80% by primitive village methods. There are different ways of processing, but all these methods consist in the following steps: treatment of harvested bunches; separation of fruit from stalk; boiling of the fruit; fruit digesting/pounding; oil extraction from pericarp; kernel separation from pericarp; oil clarification; kernel drying. AA

- 2729 ONG (ASH), BOEY (PL) and NG (CM). Fractionation studies of palm oil by density gradient. *J. Am. Oil Chem. Soc.* 60(10); 1983; 1755-60

Vegetable, animal, and fish oils (particularly palm oil) can be easily fractionated by adding two common solvents (water and methanol, or water and isopropanol) to the oil and centrifuging the mixture. After centrifugation the olein and the stearin are separated by the solvent medium in the middle. Crude palm oil could be separated into seven fractions having different characteristics, when a density gradient was employed. KMD

CITRUS OIL

- 2730 WILSON (CW) and SHAW (PE). Quantitation of individual and total aldehydes in citrus cold-pressed oils by fused silica capillary gas chromatography. *J. Agric. Food Chem.* 32(2); 1984; 399-401
 Total aldehydes determined by GC ranged from 93% to 100% of U.S.P. values. Major aldehydes in these oils were octanol and decanol. JVS

FAT

- 2731 YANISHLIEVA (NVI) and SCHILLER (H). Effect of sitosterol on autoxidation rate and product composition in a model lipid system. *J. Sci. Food Agric.* 35(2); 1984; 219-24
- 2732 BESSLER (TR) and ORTHOEFER (FT). Providing lubricity in food fat systems. *J. Am. Oil Chem. Soc.* 60(10); 1983; 1765-8
 Lubricity, or mouth-feel, in food products depends on the degree of unsaturation, fatty acid distribution, and geometrical isomerization of the food fat during processing. Sufficient solid fat content must be balanced by necessary oxidative stability. The products discussed include salad oils and their formulations (in the form of pourable, or spoonable, salad dressings and mayonnaises), frying oils, imitation dairy products, margarines, and bakery shortenings. Past, present, and future technology has been evaluated. KMD
- 2733 LOVELAND(PM), PAWLOWSKI (NE), LIBBEY (LM), BAILEY (GS) and NIXON (JE). HPLC analysis of cyclopropenoid fatty acids. *J. Am. Oil Chem. Soc.* 60(10); 1983; 1786-8
- 2734 ARENS (M) and KROLL (E). Survey by a working party of the DGF, analysis of fat raw materials. VII. *Fette Seifen Anstrichm.* 85(8); 1984; 307-11 (German)
- 2735 HOFMANS (WF) and JOS (AJ). Duration of use of frying fat under practical conditions. *Voeding.* 44(11); 1983; 384-7
 The contents of dimeric and polymeric triglycerides, the acid value, and the organoleptic quality are the parameters that determine the quality of frying fat in use. The maximum permissible time of use for a frying fat, of the composition given in this paper, is 27 hours at 180 C. KMD
- 2736 ENIG (MG), PALLANSCH (LA), SAMPUGNA (J) and KEENEY (M). Fatty acid composition of the fat in selected food items with emphasis on *trans* components. *J. Am. Oil Chem. Soc.* 60(10); 1983; 1788-95
- 2737 WHITE (PJ) and HAMMOND (EG). Quantitation of carbonyl compounds in oxidized fats a trichlorophenylhydrazones. *J. Am. Oil Chem. Soc.* 60(10); 1983; 1769-73
- 2738 FRANZKE (C1) and KROLL (J). On the detection of mineral oil in edible fats. *Lebensmittel-industrie.* 30(5); 1983; 223-4 (German)
 The presence of less than 1% of mineral oil in an edible fat cannot be detected with certainty by either sensory, or fluorescence, or saponification tests. But thin-layer chromatography does succeed in detecting an

admixture $\geq$ 0.1% of mineral oil. Column chromatography is more suitable for the quantitative determination of mineral oil (hydrocarbons) in fats. Except in the case of olive oil, a hydrocarbon content $>$ 0.15% is an indication of contamination of the edible fat with mineral oil. KMD

- 2739 MULLER-GOYMANN (CC). The phase behaviour of mixtures of cholesterol-fatty alcohol and cholesterol-fatty alcohol water. *Fette Seifen Anstrichm.* 85(7); 1983; 267-73 (German)

ERIOBOTRYA JAPONICA FAT

- 2740 RAIE (MY), ZAKA (S) and SALEEM (M). Chromatographic analysis of *Eriobotrya japonica* fat. *Fette Seifen Anstrichm.* 85(8); 1983; 325-6

Thin layer chromatography and infrared spectrophotometry of the fat of *Eriobotrya japonica* shows the presence of hydrocarbons (3.1%), wax esters (5.3%), triglycerides (78.6%) and the last polar fraction containing fatty acids, colouring matter, etc. (13.0%). After the saponification of the fat, the fatty acids C₁₂-C₂₄ and fatty alcohols C₁₂-C₂₆ determined first time as methyl esters and acetates respectively were identified by the application of gas liquid chromatography. AA

SAL FAT

- 2741 CHAUDHURI (PG), CHAKRABARTY (MM) and BHATTACHARYYA (DK). Effect of hydrogenation on the thermal properties of sal (*Shorea robusta*) mango kernel (*Mangifera indica*) and mowrah (*Madhuca latifolia*) fats. *Fette Seifen Anstrichm.* 85(7); 1983; 259-62

On hydrogenation, the supercooling temperature gradually increases and the rise in temperature on solidification decreases. Dilatation of the hydrogenated samples show that with progress of hydrogenation the dilatation is lower than that of the original fat which again improves with the formation of trans acids. However, the melting range is extended with the formation of trans acids, giving rise to a series of products having long plastic range. AA

SPICES AND CONDIMENTS

- 2742 TOKARSKA (B) and KARWOWSKA (K). The role of sulphur compounds in evaluation of flavouring value of some plant raw materials. *Nahrung.* 27(5); 1983; 443-7

The aim of the study was to determine the composition of flavour isolates from garlic and horse-radish, prepared by dichlorodifluoromethane extraction. Gas chromatography, with olfactory determination of the flavour of the resolved components, and gas chromatography combined with mass spectrometry were used. In the garlic extract, 19 components comprising mono-, di-, and tri-sulphides and thiophene derivatives were detected. In the horse-radish extract, 14 components including isothiocyanates, thiocyanates and cyanides were identified. AA

SAFFRON

- 2743 SAMPATHU (SR), SHIVASHANKAR (S) and LEWIS (YS). Saffron (*Crocus sativus* Linn) - cultivation, processing, chemistry and standardization. *CRC Crit. Rev. Food Sci. Technol.* 20(2); 1984; 123-57

Discusses: botanical description; uses; producing countries and world trade; cultivation; harvesting, processing and yields; chemistry; adulteration, methods of detection and purity evaluation; and official requirements/standards. BSN

TURMERIC

- 2744 PHILIP (J). Studies of growth, yield and quality components in different turmeric types. *Indian Cocoa Arec. Spices J.* 6(4); 1983; 93-97

SENSORY EVALUATION

- 2745 HEINEVETTER (L) and HAHNEMANN (H). On a capillary suction device with electronic reception of the measured values for detecting the absorption of fluids by powdery swellable substances. *Nahrung.* 27(7); 1983; K23-K24 (German)

- 2746 KOCHAN (A) and GRIMM (M). Further development of complex quality securing by sensory and metric evaluation of the texture. *Nahrung.* 27(7); 1983; 619-31 (German)

The general impression of a chocolate is produced by textural features, as well as by olfactory and gustatory characteristics. The intensity and the time course of perception of the gustatory properties are very strongly influenced by the kind and duration of the melting process. The development of the respective texture, however, depends upon the processing and the material. A sensory evaluation during consumption revealed the quality-relevant textural parameters. The authors' describe above all sensory methods, and attempt to corroborate the organoleptically determined breaking sensation by breaking strength measurements for the purpose of establishing functional relationships between the sensations perceived and the instrumental measurements. AA

- 2747 BARYLKO-PIKIELNA (N), ROTHE (M), PIETRAZAK (E) and JACKOWSKA (A). Sensory characteristics of 2-heptanone. Part I. Threshold values, concentration/odour intensity relations, methodological aspects. *Nahrung.* 27(5); 1983; 391-401

The threshold values and concentration/odour intensity relations of 2-heptanone have been evaluated in two laboratories using strictly uniform materials, methods and laboratory procedures. The results obtained in an aqueous and in an oily medium have been discussed, taking into account the influence of different methods and judges. Standardization of the methods and the detailed laboratory procedure to be adopted appear to be of critical importance in ensuring reproducibility of the results in various sensory laboratories. KMD

- 2748 FISZMAN (SM), COSTELL (E) and DURAN (L). Measurement of the rheological behaviour of solid foods. II. Fundamental methods. *Rev. Agroquim. Tecnol. Aliment.* 23(3); 1983; 303-9 (Spanish)

This paper contains the theoretical background of the study that has been carried out by the authors. The aspects covered are: (i) the tension-deformation relation; (ii) the tension-time (or relaxation) relation; and (iii) the deformation - time relation. KMD

- 2749 KOSZINOWSKI (J) and PIRINGER (O). Importance of oxidation products of unsaturated hydrocarbons in the sensoric properties of food packaging. Part I. Oxygen derivatives of the 1-alkenes. *Dtsch. Lebensmittel-Rundschau.* 79(6); 1983; 179-83 (German)

The sensory properties and threshold values, as well as the gas-chromatographic retention indices and mass spectra of normal-1-alkene-3-ones, 1-alkene-3-ols, and 2-alkenals were investigated, as it is known that some compounds resembling these - particularly 1-heptene-3-one, and 2-nonenal - belong to the odour components of polyethylene containing packaging material. It was not possible to establish a clear correlation between some unidentified GC peaks and the sensory quality of the packaging, because only a few compounds at extremely low concentrations are responsible for packaging odour. KMD

- 2750 SHAKUNTALA MANAY (N). Sensory evaluation of cutlets prepared from varying proportions of meat and textural vegetable proteins. *Indian J. Nutr. Dietet.* 20(2); 1983; 56-59

Cutlets were prepared by soaking textured vegetable protein (TVP; 50% or more protein), soaked in thrice its weight of lukewarm water, minced mutton (different proportions 0-100%) and seasoning (oil, onion, mint, ginger, garlic, tomato ketchup, cumin and chilli powder in the proportion of 1: 10: 2: 1: 1: 1: 0.1: 0.1). The cutlet mixture weighing 18 g (15 g meat or meat and TVP and the rest made up of seasoning) was shaped into cutlets, dipped in beaten egg, coated with bread crumbs and deep fried in oil. Sensory evaluation studies have revealed that on the basis of scores for flavour, appearance, texture and quality, TVP could almost completely replace meat. However, cutlets upto 30% TVP were better preferred by the panelists. BSN

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

- 2751 PURI (G) and SHARMA (SP). Changes in trehalose levels with age in the bruchid, *Callosobruchus maculatus* (fabr). *Insect. Sci. Applicat.* 5(2); 1984; 103-105

- 2752 MADRID (FJ) and SINHA (RN). *Haplotinea insectella* (Fabricius) (Lepidoptera: Tineidae) - A potential pest of stored cereals in North America. *J. Stored Prod. Res.* 20(2); 1984; 107-10

The first incidence of *H. insectella* in Canada has been reported in over

wintered wheat and oats in Winnipeg. The feeding, diapause, development and mortality of this insect on crushed cereals, oilseeds and on fungi at 25 ± 1 C and $70 \pm 2\%$ R.H. have been studied. JVS

- 2753 BRIERS (T) and DE LOOF (A). Distribution and metabolism of ecdysteroids in the adult yellow mealworm beetle, *Tenebrio molitor*. *Insect. Biochem.* 13(5); 1983; 513-22
- 2754 IMURA (O) and NAKAKITA (H). The effect of temperature and relative humidity on the development of *Tribolium freemani* Hinton (Coleoptera: Tenebrionidae). *J. Stored Prod. Res.* 20(2); 1984; 87-95
 The egg-period and hatchability were affected by temperature but not markedly by relative humidity (R.H.). The shortest and highest rate of larvae/pupal development and adult emergence and the matching temperature and R.H. have been reported. The thermal constants for egg, larval, and pupal stages and for total development were 66.1 ± 3.98 , 303.2 ± 34.92 , 101.7 ± 2.73 , and 434.2 ± 48.07 respectively. *Tr. freemani* required more of degree days than *Tr. castaneum*, *Tr. confusum* or *T. madens*. JVS
- 2755 GOTHI (KK), TAMHANKAR (AJ) and RAHALKAR (GW). Influence of larval diapause on male response to female sex pheromone in *Trogoderma granarium* Everts (Coleoptera; Dermestidae). *J. Stored Prod. Res.* 20(2); 1984; 65-9
 The post diapause males showed reduced altractancy to female sex hormone; the reduced response was proportional to the duration of the diapause of larva. It appeared that the pheromone concentration for maximal attraction was much higher for the post diapause males. JVS
- 2756 ODHIAMBO (TR). International aspects of crop protection: The needs of tropical developing countries. *Insect. Sci. Applicat.* 5(2); 1984; 59-67
- 2757 WILKIN (DR), CRUICKSHANK (SL) and DYTE (CE). Pesticide use on grain in commercial grain stores. *Int. Pest Control.* 25(3); 1983; 82-5
 Reports data and results of a questionnaire survey conducted by Grain and Feed Trade Association (GAFTA), U.K. on the usage of pesticide and formulation used, technique of application and awareness of safety and effective insect control. BSN
- 2758 MILLER (LK), LINGG (AJ) and BULLA (LA) Jr. Bacterial, viral, and fungal insecticides. *Science.* 219(4585); 1983; 715-21
 Discusses: bacterial insecticides; toxin of *B. thuringiensis* subsp. *Kurstaki*; insecticidal proteins from other subsp. *B. thuringiensis*; insect toxin gene of *B. thuringiensis*; viral insecticides; baculovirus infections; molecular biology of a baculovirus; fungal insecticides; and future considerations. BSN
- 2759 STRINGHAM (RW) and TEUBERT (WE). Liquid chromatographic determination of benomyl in wettable powders. *J. Assoc. Off. Anal. Chem.* 67(2); 1984; 302-3
 After extraction with acetonitrile containing 3% n-butyl isocyanate, pesticide formulations containing Benomyl were chromatographed on a reverse phase - C-18 column. The Benomyl can be quantitatively determined in intact form by employing acetonitrile - 2% acetic acid (80+20) as mobile phase and detection at 290 nm. Mean recovery of standard from sample was 95% the S.D. being 3.5%. JVS

- 2760 DUREJA (P), CASIDA (JE) and RUZO (LO). Dinitroanilines as photostabilisers for pyrethroids. *J. Agric. Food Chem.* 32(2); 1984; 246-50
Twelve pyrethroids which included pyrethrins, Allethrin, Kadethrin, Reamethrin, Tetramethrin and cyphenothrin could be stabilised by some 4 substituted 2,6-dinitroaniline. Effective stabilisers included trifluralin and some of its analogues. A 5:1 cyphenothrin - Trifluralin mixture was as photostable as cypermethrin on silica gel. JVS
- 2761 AKHTAR (MH). Metabolism of Deltamethrin by cow and chicken liver enzyme preparations. *J. Agric. Food Chem.* 32(2); 1984; 258-62
Deltamethrin is an important member of synthetic pyrethroid family. It was found to be metabolised by enzyme/s in various fractions of liver homogenates from cow and chicken. Six metabolites could be identified. JVS
- 2762 TSUSHIMOTO (G), CHANG (CC), TROSKO (JE) and MATSUMURA (F). Cytotoxic, mutagenic, and cell-cell communication inhibitory properties of DDT, lindane, and chlordane on Chinese hamster cells *in vitro*. *Arch. Environ. Contam. Toxicol.* 12(6); 1983; 721-30
- 2763 BAUMANN (M), DEML (E), SCHAFFER (E) and GREIM (H). Effects of polychlorinated biphenyls at low dose levels in rats. *Arch. Environ. Contam. Toxicol.* 12(5); 1983; 509-15
- 2764 BOND (EJ), DUMAS (T) and HOBBS (S). Corrosion of metals by the fumigant phosphine. *J. Stored Prod. Res.* 20(2); 1984; 57-63
The corrosion of copper by phosphine was much higher than that of other metals. Corrosion was found to increase with increase in R.H. fumigant/oxygen levels and repetition of treatments. Mainly acids of phosphorus accumulated on surfaces of copper, silver and gold. Potassium dichromate appeared protection to metals against corrosion. JVS
- 2765 BELL (CH), WILSON (SM) and BANKS (HJ). Studies on the toxicity of phosphine to tolerant stages of *Trogoderma granarium* Everts (Coleoptera: Dermestidae). *J. Stored Prod. Res.* 20(2); 1984; 111-7
Some larvae of field strains of *Tr. granarium* survived for 4 days at 20 C, 60 R.H., at a Ct product of 164 g hr/Cu.m. Larvae from laboratory stocks were killed in 4 days at 120 g.hr/Cu.m., and eggs in 3 days at 50 g. hr/Cu m. Complete control of many stocks of this insect could be achieved by using a mixture of MB and PH_3 rather than using PH_3 alone. JVS
- 2766 HERNANDEZ (A) and DRUMMOND (DC). A study of rodent damage to food in some Cuban warehouses and the cost of preventing it. *J. Stored Prod. Res.* 20(2) 1984; 83-6
Food commodities (rice, beans, paste, etc.) were found to suffer a loss of 1% in a storage period of 1-3 months. The loss could be prevented by warfarin baits. JVS
- 2767 FRANCIS (BM), METCALF (RL) and FISHER (SW). Response of laboratory rodents to selected avian delayed neurotoxicants. *Arch. Environ. Contam. Toxicol.* 12(6); 1983; 731-8
- 2768 ARORA (KK) and LAL (SS). Acceptability of two acute rodenticides to black rat *Rattus rattus* (Linn). *Int. Pest Control.* 25(3); 1983; 89-90
Vacor (RH 787), a rodenticide was found to be more palatable to *Rattus rattus* and also gave 100% mortality with 0.25% and 0.50% concentrations, as

compared to treatment with the rodenticide, zinc phosphide. Since the total amount of vacor consumed per 100 g rat with both the dosages and the mortality times were not significantly different, it has been recommended that vacor may be used economically and efficiently at 0.25% dosages for control of *Rattus rattus*. BSN

- 2769 NARASIMHAN (KS), SHARANGAPANI (MV), MUTHU (M) and MAJUMDER (SK). Studies on acrylonitrile as a rat burrow fumigant. *Int. Pest Control.* 25(3); 1983; 76-7, 80

The effectiveness and suitability of dosages of as low as 20 mg/l (2.5 cm³/100 litre burrow) of acrylonitrile as a rat burrow fumigant has been investigated. 100% mortality was recorded against *Rattus norvegicus* within two hours with this dosage. Mud blockages showed down passage of acrylonitrile within the burrow, but rats still died after four hours in a gallery scaled in this way, with the fumigant concentration of 1.0 mg/l having been reached. Diffusion and efficiency of acrylonitrile was improved when chloroform was used as an adjunct. BSN

- 2770 BUTTERY (RG), KAMM (JA) and LING (LC). Volatile components of red clover leaves, flowers, and seed pods: Possible insect attractants. *J. Agric. Food Chem.* 32(2): 1984; 254-6

The volatile components associated with the main different parts of the red clover plant have been analyzed by using Tenax trapping and GLC-MS analysis. The major volatile components identified were, for the leaves, (Z)-3-hexenyl acetate, (Z)-3-hexenol, and (E)- and (Z)- β -ocimenes, for the flowers, acetophenone, methyl cinnamate, and 1-phenylethanol, and, for the seed pods, (E)- and (Z)- β -ocimenes, an unidentified sesquiterpene hydrocarbon, and longifolene. AA

- 2771 AHAMED (MB), ABDUL HAKEEM (MS), BASHYAM (N) and SUDARSAN (S). Studies on the stability of dithane-Z-78 (Zineb) in storage. *Pesticides.* 18(2); 1984; 27-9, 32

BIOCHEMISTRY AND NUTRITION

- 2772 LEPEN (B) and ADRIAN (J). Consequences of phytic acid on the availability of some metals. *Sci. Aliment.* 3(4); 1983; 629-44 (French)

Phytic phosphorus has a metabolism comparable to mineral phosphorus, if one takes faecal and urinary excretion as the basis. However, it is capable of passing through the intestinal wall, and even the renal barrier in a non-degraded form. With metals, phytic acid forms complexes which are soluble in acidic media; their cohesive force increases in the following order: Cd, Zn, Cu, Fe, Pb, and Sn. It increases the intestinal absorption of Cd, Cu, Fe, and Zn, and decreases that of Ca, Mg, and Pb. In the presence of high concentrations of metals, it appears to aggravate the toxicity of Cd, Cu and Zn, and to diminish that of Pb and Sn. These phenomena are not linked with the solubility of phytates, but to the cohesive force of the complexes formed with the metallic cations. KMD

- 2773 KIRCHGESSNER (M), REICHLMAYR-LAIS (AM), KIM (JJ) and GRASSMANN (E). Iron content in muscle as a result of varying the iron and protein supply of the diet. *Z. Lebensmittel-Unters Forsch.* 177(6); 1983; 444-6 (German)

In a 2 x 3 factorial experiment with growing rats (starting weight 32 g), the Fe content (5, 25, 625 mg/kg) and the protein content (5, 25, 45%) of the diet was varied. The diets were fed *ad libitum* for 35 days. At the end of the experiment the animals were sacrificed. The iron content was determined in a defined sample of *musculus supraspinalis* after dry ashing with AAS. An insufficient protein supply produced an overall increased iron content and a reduced muscle mass. A deficient iron supply caused a lowered iron content in the muscle in the case of sufficient and excessive protein content of the diet. On the other hand, an iron supply exceeding the requirement did not lead to higher iron content. AA

- 2774 ALBRIGHT (KJ), GORDON (DT) and COTTERILL (OJ). Release of iron from phosvitin by heat and food additives. *J. Food Sci.* 49(1); 1984; 78-81

Most of the iron in egg yolk is bound by phosvitin. Heating whole egg or yolk in a double boiler does not release this iron. Also, heating a 0.125 mg/ml solution of phosvitin in distilled water for 20 and 40 minutes at 110 C did not free iron. A second phosvitin solution was mixed equally with 0.04M citric acid, 2 M NaCl and 0.03 M Na₂ EDTA. Only EDTA released (ca ½) iron from phosvitin without heating. AA

- 2775 GATLIN (MM) and McNAUGHTON (JP). Calcium and iron status in diabetic and control rats fed guar gum and fructose. *Nutr. Rep. Int.* 28(6); 1983; 1207-15

Guar gum fed, on a dry matter percentage basis, in the amount suggested (contained 33.25% sucrose or fructose; and either 4.3% guar gum plus 0.7% cellulose or 5% cellulose) beneficial for controlling hyperglycemia in humans with diabetes may diminish calcium absorption and thus bone status. Also, liver iron stone may be impaired when the fiber is fed. Fructose may enhance iron and calcium absorption especially in the presence of soluble fibers believed to reduce absorption of the minerals. KAR

- 2776 NIESSEN (Chr), BRUSSAARD (JH) and KATAN (MB). Serum lipids and dietary composition of 371 students at Wageningen. *Voeding.* 44(10); 1983; 350-55

The serum lipids in, and dietary habits of, 220 male and 161 female students at Wageningen (Netherlands) were studied during the period 1976-1979. Total and HDL cholesterol were 4.8 and 1.6 mmol/l for women, and 4.3 and 1.4 mmol/l for men. The food intake was characterized by a low mean intake of fat (31% of energy), and cholesterol (288 mg/day), and high intakes of plant protein (6% of energy) starch (27% of energy) and dietary fibre (39 g/day). The ratio of polyunsaturated to saturated fatty acids was 0.36. There was a low, but significant, degree of correlation between the observed serum cholesterol concentrations and the values predicted from the dietary fatty acids and cholesterol according to Key's formula ($r = 0.14$, $P < 0.05$). A very significant correlation was found between consumption of dietary fibre on the one hand, and that of saturated fatty acids ($r = -0.44$), cholesterol ($r = -0.22$), and plant protein ($r = +0.77$) on the other. KMD

- 2777 WISE (A), ROWLAND (IR) and MALLETT (AK). Dietary lactose and the metabolic activity of the caecal microfloras of weanling and adult rats. *Food Chem. Toxicol.* 22(2); 1984; 113-7

Weanling or adult (9 week old) rats were fed diets containing 0, 250 or 500 g lactose/kg for 10 days, after which the activities of six caecal microbial enzymes (azoreductase, β -glucosidase, β -glucuronidase, nitrate reductase, nitroreductase and urease) were determined. Adult controls had

larger caeca than weanlings, but the numbers of bacteria were not significantly different. Expressed in relation to body weight, caecal microbial enzyme activities were significantly lower in adult controls, with the exceptions of β -glucuronidase and urease. Lactose caused caecal enlargement; this was greatest in weanling animals, which also showed a decreased concentration of bacteria. Lactose increased total nitrate reductase and urease activities in both age groups, but decreased total azoreductase and nitroreductase activities in weanlings. Enzyme activities per 10^9 bacteria were decreased for azoreductase, β -glucosidase, β -glucuronidase and nitroreductase in both age groups, while urease activity increased. Azoreductase and nitroreductase activities were highly correlated but nitrate reductase and urease did not correlate significantly with any other enzyme activity. AA

- 2778 SCRIMSHAW (NS). Revised PAG guidelines for the development of novel protein sources. *Nahrung*. 27(8); 1983; 815-6
- 2779 SALAHUDDIN (A) and WASEEM (A). Functional properties of divalent derivatives of concanavalin A. *Indian J. Biochem. Biophys.* 21(2); 1984; 93-8
Interaction of succinylated con A dimer and pH 5 dimer primarily with dextran has been studied. Con A was isolated from jack bean meal and purified by affinity chromatography. One of the notable observations was that Con A dextran precipitin reaction with succinylated Con A was appreciably lower than that obtained with pH 5 dimer. The two markedly differed in the net charge and hence electrostatic free energy. MVG
- 2780 FRIEDMAN (M), PANG (J) and SMITH (GA). Ninhydrin-reactive lysine in food proteins. *J. Food Sci.* 49(1); 1984; 10-13,20
An improved ninhydrin reagent (lithium acetate - dimethyl sulfoxide ninhydrin reagent) proved to be useful for reaction of amino groups in a series of structurally diverse food proteins and flours with various lysine contents has been employed. In the protein studied, the ninhydrin-reactive lysine content varied widely from theoretical values. It was therefore, suggested that these variations be taken into account in applications of the ninhydrin procedure to food proteins to determine lysine. MVG
- 2781 PORTER (DH), SWAISGOOD (HE) and CATIGNANI (GL). Characterisation of an immobilized digestive system for determination of protein digestibility. *J. Agric. Food Chem.* 32(2); 1984; 334-9
The digestibilities of plant/animal proteins have been determined by using pepsin, trypsin alpha-chymotrypsin and intestinal mucosal peptidases immobilised on porous glass beads. The immobilized enzyme system was stable without significant loss of activity. JVS
- 2782 GOPAL MISRA. Is vitamin C safe? *Sci. Rep.* 20(6); 1983; 336-8, 342
Discusses the claim that vitamin C has the potency to cure a wide range of ailments. BSN
- 2783 SPEEK (AJ), SCHRIJVER (J) and SCHREURS (WHP). Fluorometric determination of total vitamin C and total isovitamin C in foodstuffs and beverages by high performance liquid chromatography with precolumn derivatisation. *J. Agric. Food Chem.* 32(2); 1984; 352-5
Ascorbic acid (AA) and erythorbic acid (EA) are enzymatically oxidised to dehydro-1-ascorbic acid (DHAA) and dehydroerythorbic acid (DHEA) in foodstuffs and beverages. The DHAA and DHEA are converted into highly

fluorescent quinoxaline derivatives (by treatment with *o*-phenylenediamine) which are separated by reverse-phase HPLC and fluorometrically determined. Total vitamin C and isobovitamin C can be estimated at levels as low as 0.2 microgram/gram. DHAA and DHEA can also be determined without the step of enzymatic oxidation. JVS

- 2784 PRASAD (AS). Clinical, biochemical and nutritional spectrum of zinc deficiency in human subjects: An update. *Nutr. Rev.* 41(7); 1983; 197-208
- 2785 ANON. Plasma levels of zinc in protein-calorie malnutrition and after nutritional rehabilitation. *Nutr. Rev.* 41(7); 1983; 209-11
- 2786 ATKINS (FM). The basis of immediate hypersensitivity reactions to foods. *Nutr. Rev.* 41(8); 1983; 229-34
- 2787 PRZYBYLA (A). Trends in food industry responses to changing consumer awareness of nutrition and health. *Activities Rep.* 35(2); 1983; 70-73
- 2788 WOTEKI (K). Nutritional criteria for USDA family food plans. *Activities Rep.* 35(2); 1983; 64-9
- 2789 IACABONI (F). Nutritional standards and policies for garrison and combat feeding. *Activities Rep.* 35(2); 1983; 56-8
- 2790 MERGEN (C). Implementation of nutritional standards in enlisted dining facilities. *Activities Rep.* 35(2); 1983; 59-63
- 2791 BAECKE (JAH) and VAN STEVEREN (WA). Food consumption among young adults. *Voeding.* 44(11); 1983; 400-405
The energy intake of young men (aged 20-30 years) is rather high. It must be pointed out that the energy intake on working days is normal; but during week-ends it is higher, mainly because of a much higher consumption of alcohol, which is not compensated by a reduction in the intake of other foods. A more prudent diet is advisable. The consumption of between-meal snacks must be restricted because (a) they do not consist of a set of wisely chosen foods, and (b) they contribute a great deal of energy (35% of daily intake) to the diet. KMD
- 2792 ANON. Protein malnutrition and leukocyte endogenous mediator. *Nutr. Rev.* 41(8); 1983; 242-4
- 2793 CHAUHAN (BM) and KAPOOR (AC). Fortification: a potential weapon to combat malnutrition. *Sci. Cult.* 50(2); 1984; 40-45
The various aspects considered include fortification of salt; cereal and cereal products; oils and fats; milk, fruit products; sugar-
tea; and sago under the conditions prevailing in India. MVG
- 2794 SCHLOSS (OM). A case of allergy to common foods. *Nutr. Rev.* 41(8); 1983; 249-52
- 2795 BUNNIK (GSJ) and BOSLAND (MC). Diet and cancer: An investigation by experiments on animals. *Voeding.* 44(10); 1983; 344-9
A methodology for the investigation of the effects of diet on cancer in experimental animals has been described.

TOXICOLOGY AND HYGIENE

- 2796 GUILLOT (JP), GONNET (JF), CLEMENT (C) and FACCINI (JM). Comparative study of methods chosen by the Association Francaise de Normalisation (AFNOR) for evaluating sensitizing potential in the albino guinea-pig. *Food Chem. Toxicol.* 21(6); 1983; 795-805

An evaluation was made of the different protocols recommended by the Association Francaise de Normalisation (AFNOR) for assessing the sensitizing potential of chemicals in the guinea-pig. The methods studied were those of Magnusson & Kligman (*J. Invest. Derm.* 1969, 52, 268), Maguire (*J. Soc. Cosmet. Chem.* 1973, 24, 151), Maurer *et al.* (*Agents & Actions* 1975, 5, 174), Klecak *et al.* (*J. Soc. Cosmet. Chem.* 1977, 28, 53), Dossou & Sicard (1984, to be published) and a hitherto unpublished method of Guillot, Gonnet, Clement & Brulos. Results obtained by each method were compared in tests on the allergenic reference substances dihydrocoumarin, *p*-phenylenediamine, formalin, penicillin G and benzocaine (ethoform) and on propylene glycol (negative control). The results showed that the number of animals sensitized often varies with the choice of experimental protocol, that inclusion of tests on a control substance is essential, and that while quantitative differences were found, and methods were qualitatively similar their capacity to identify allergens in the guinea-pig. AA

- 2797 SCHINDLER (E). Heavy metal contents of cereals and cereal products, and of muscle meat, liver, and kidney. *Dtsch. Lebensmittel-Rundschau.* 79(10); 1983; 338-40 (German)

The lead, copper, and cadmium contents of various Austrian mill products (grain, bran, and grits of wheat, maize, and rye) were measured. Only in a few isolated cases did the heavy metal levels exceed the limit of permissibility. The Pb, Cd and Cu contents of meat (muscle), liver and kidney were also below the permissible limits. KMD

- 2798 LAUTERBACH (K) and KLEMP (CHR). Rapid method for routine analysis of total mercury in foods. *Nahrung.* 27(8); 1983; 741-5 (German)

Mercury is determined by cold vapour atomic absorption spectrometry after mineralisation of the test material by a $\text{HClO}_4/\text{HNO}_3$ -mixture. The digestion method used is well suited for all foods that can be homogenized with the exception of fats and foods containing predominantly fat. The detection limit is at 10 ng Hg, the variation coefficient is 7.1% for 18 ng Hg and the recovery rate (100 ± 7) %. AA

- 2799 UNGSURUNGSIE (M), PAOVALO (C) and NOONAI (A). Mutagenicity of extracts from Ceylon cinnamon in the REC assay. *Food Chem. Toxicol.* 22(2); 1984; 109-12

The extraction of about 1.9 kg of Ceylon cinnamon (*Cinnamomum zeylanicum* Nees) with 10 litres each of petroleum ether, chloroform and ethanol in a Soxhlet apparatus produced extracts weighing 76, 28 and 270 g respectively for the three solvents. In the preliminary test the ethanol extract showed no mutagenic activity. However, both the petroleum ether and the chloroform extracts showed mutagenicity when tested in the *rec* assay using *Bacillus subtilis* strains H17 (*rec*⁺) and M45 (*rec*⁻). When these extracts were studied quantitatively by the liquid and spore *rec*-assay methods, the minimum inhibitory concentrations of the extracts against strain H17 were higher than those against strain M45. However, in the presence of the liver S-9 mix,

the minimum inhibitory concentrations of the petroleum ether and chloroform extracts against both strains of *B. subtilis* were equal, indicating that the mutagenicity of the extracts had been inactivated. AA

- 2800 STONARD (MD), SAMUELS (DM) and LOCK (EA). The pathogenesis and effect on renal function of nephrocalcinosis induced by different diets in female rats *Food Chem. Toxicol.* 22(2); 1984; 139-46

The ability of three diets to produce nephrocalcinosis in female rats has been compared after 30, 60 and 90 days of feeding. Severe nephrocalcinosis with associated tubular damage was induced with a standard laboratory maintenance low-protein diet and with a diet containing a single-cell protein (Pruteen) but not with a casein-containing diet. Both the Pruteen and casein diets were high-protein diets. The development of the lesion was equally rapid following feeding of either the laboratory maintenance diet or the Pruteen diet. Nephrocalcinosis was present, with body kidneys similarly affected, at each 30-day interval with either diet. A severe degree of nephrocalcinosis was associated with widespread renal damage although signs of tubular regeneration and repair were evident at 30 days. Nephrocalcinosis induced by the Pruteen diet was accompanied by enlargement of the kidney. AA"

- 2801 ARORA (RG), FROLEN (H) and FELLNER-FELDEGG (H). Inhibition of ochratoxin A teratogenesis by zearalenone and diethylstilboestrol. *Food Chem. Toxicol.* 21(6); 1983; 779-83

The modifying effect of zearalenone (ZEN) and diethylstilboestrol (DES) on ochratoxin A (OCT A) teratogenesis was investigated in the mouse. The results indicate that these non-steroidal oestrogenic substances of mycological (ZEN) and synthetic (DES) origin may protect the foetus from the teratogenic effects of OCT A by some unknown mechanism. AA

- 2802 CLEVSTROM (G) and LJUNGBEREN (H). Occurrence of storage fungi, especially aflatoxin-forming *Aspergillus flavus*, in soil, greenstuff and prepared hay. *J. Stored Prod. Res.* 20(2); 1984; 71-82

- 2803 DORNER (JW), COLE (RJ) and HILL (PA). Tremorgenic mycotoxins produced by *Aspergillus fumigatus* and *Penicillium crustosum* isolated from molded corn implicated in a natural intoxication of cattle. *J. Agric. Food Chem.* 32(2); 1984; 411-3

When these two organisms were cultured on corn, both proved toxigenic. *A. fumigatus* isolate produced Verrucalogen and many clavine alkaloids while *P. crustosum* produced Penitrem A and tremorgens. JVS

- 2804 MEERARANI (S) and SHANMUGASUNDARAM (ERB). Effect of the food contaminant *Aspergillus versicolor* toxicity on amino acid uptake in rats. *Curr. Sci.* 53(2); 1984; 92-4

A. versicolor toxicoses caused in albino rats, by sterigmatocystin reduced the levels of total ATPase, Na^+K^+ dependent ATPase and alkaline phosphatase while reducing that of 5'-nucleotidase. The decreased levels of enzymes suggest that the toxin affects the membrane integrity and permeability. The decrease of alkaline phosphatase might be due to the fact that the membrane plasticity is affected. The increase in 5'-nucleotide, a marker enzyme for plasma membrane, reflects the membranal disturbances caused by toxicity. The uptake of the two amino acids, ^{14}C -methionine and ^{14}C -alanine was also studied. Both were significantly lowered in the intestinal

tissue of the experimental group which could be due to membrane damage, and damage to carrier systems of impairment of reactions providing energy for active transport of amino acid. MVG

- 2805 JOHNSON (KM), NELSON (CL) and BUSTA (FF). Influence of heating and cooling rates of *Bacillus cereus* spore survival and growth in a broth medium and in rice. *J. Food Sci.* 49(1); 1984; 34-9

Survival, spore germination, and growth of emetic and diarrheal type strains of *Bacillus cereus* were evaluated in broth and rice media during heating and cooling. Samples were heated to 80 C (20 C/hour or 40 C/hour) or 90 C (ca. 900 C/hour), prior to cooling to 10 C (5 C/hour or 10 C/hour). Following heating to 80 C, growth occurred during 5 C/hour cooling. After heating to 90 C, inactivation of three strains occurred during cooling from 90 to 80 C and again from 50 to 40 C. Great variability was observed among the responses of the four strains. Emetic strains exhibited greater survival than diarrheal strains. Rice reduced low temperature inactivation, and did not favour emetic strains. Significant two and three way interactions existed among media, strains, heating and cooling rates. AA

- 2806 BECKERS (HJ) and VAN ERNE (EHW). Survival of *Salmonella* spp., *Staphylococcus aureus* and *Bacillus cereus* in "advocaat". *J. Food Prot.* 46(2); 1983; 98-9

- 2807 TODD (EC). Factors that contributed to food borne disease in Canada, 1973-77. *J. Food Prot.* 46(8); 1983; 737-47

Discusses: factors involving contamination, survival or growth; types of persons most susceptible to food borne disease; and sensory factors that should have prevented foods which caused illness from being eaten. BSN

I N D E X

- Acacia senegal* See gum arabic
 Acetoin, *Streptococcus lactis* 2450
 Acrylonitrile, rodenticide 2769
 Additive, bakery, effect on bread quality 2606
 Adzuki bean protein 2520
 Aflatoxin
 groundnut, determination, GC/MS 2550
 effect of preservatives 2479
 Aflatoxin M₁
 buttermilk 2614
 milk 2614
Agaricus bisporus See mushroom
 Agitation, milk bacteriological quality 2622
 Agriculture 2490
 and food industry 2400
 Albumin, cereal protein, tryptophan composition 2492
 Aldehyde in citrus oil, determination, GC 2730
 Algae
 biomass 2445-6
 chlorophyll 2445-6
 fatty acid 2445-6
 lipid 2445-6
 protein 2445-6
 supplementary value 2447
 Alkaloid
 potato 2561
 toxicity 2563
 Alkenoic ester, antifungal activity 2478
 Alkynoic acid antifungal activity 2478
 Allergy to food 2794
 Alternarial mycotoxin in fruit and vegetable products 2583
Amaranthus, amino acid composition 2568
 Amine, food 2708
 Amino acid
 Amaranthus 2568
 effect of *Aspergillus versicolor* 2804
 beer 2710
 spaghetti, effect of drying 2610
 Amylase, effect on wheat dough 2609
Anacystis nidulans See blue-green algae
Ananossativa See pineapple
 Anchovy, refrigerated, keeping quality 2675
Anguilla rostrata See eel
Anona cherimolia See cherimoya
 Antarctic fish, pesticide residue 2676
 Antifungal activity of alkenoic and alkynoic esters 2478
 Apple
 marketing 2596
 mineral composition 2597
 mycotoxin determination, HPLC 2583
 organoleptic property 2581
 storage 2596
 variety
 marketing 2596
 storage 2596
 Apple juice concentration, sugar retention 2693
 Arabinose See monosaccharide
 Argemone oil in vegetable oil 2715
 Aroma
 spirit quality 2702
 wine quality 2702
Arripis trutta See kahawai
 Arsenic in wine 2703
 Ascorbic acid
 determination, HPLC 2783
 milk
 effect of heat 2620
 effect of storage 2620
 spinach 2571
 Aseptically packaged milk, sedimentation and fat separation 2616
 Aseptic packaging 2413
 Aspartame in frozen dessert 2489
Aspergillus mycotoxin 2803
Aspergillus flavus in food 2802
Aspergillus niger, grape spoilage 2588
Aspergillus parasiticus, effect of preservatives 2479
Aspergillus versicolor, effect on amino acid 2804
 Atherosclerotic disease and homogenized milk 2626
 Atomic absorption spectrophotometer, ELISA reading 2433
 Aubergine see brinjal
Averrhoa carambola fruit, carotenoid 2598

GENERAL

- 2808 HASS (MJ). Methods and applications of genetic engineering. *Food Technol.* 38(2); 1984; 69-77

Genetic engineering is the technique of altering the DNA of a living cell to enable it to provide more and new chemicals as also perform different functions. One of the techniques used in genetic engineering is the recombinant DNA which involves the joining of DNA pieces from different organisms to yield a hybrid molecule. This article discusses, gene and protein structure/functions, basic genetic engineering technologies (organisms, DNA isolation, DNA fragmentation, cloning vectors, DNA ligation, introducing DNA into host, selection and screening. DNA sequence analysis, protoplasm fusion technology) and applications in food industry for production of enzymes, organic chemicals, flavorants/pigments, polysaccharides and manipulation of starter cultures in baking/brewing/other fermentation industries for improving efficiency. JVS

- 2809 SHARP (WR), EVANS (DA) and AMMIRATO (PV). Plant genetic engineering: Designing crops to meet food industry specifications. *Food Technol.* 38(2); 1984; 112-19

Discusses: genetic engineering/conventional breeding; clonal propagation; somaclonal and gametoclonal variation; protoplast fusion technology; and recombinant DNA technology. JVS

- 2810 TEUTONICO (R) and KNORR (D). Plant tissue culture; Food applications and the potential reduction of nutritional stress factors. *Food Technol.* 38(2); 1984; 120-27

Tissue culture refers to the *in vitro* cultivation of any plant part under aseptic conditions. Five main types of aseptic cultures, namely, plant culture, embryo culture, organ culture, segment culture, tissue or callous culture, and isolated cell culture have been distinguished. The general procedure for tissue culture consists in the; choice of a plant organ (such as a leaf or any other tissue), creating appropriate conditions for growth (by providing nutrients, growth factors, environment, temperature and moisture) for the division of the living cells of the plant organ to develop callous and sub culturing onto a solid medium or as a suspension in liquid medium. Plant tissue culture as a means of producing food ingredients such as pigments, flavours and sweeteners has been discussed; other potential food ingredients are antimicrobials, enzymes, emulsifiers, spices and vitamins. Besides these, more than 50 secondary metabolites produced by plant tissue culture have been distinguished. The main features figuring in this discussion relate to: the history of tissue culture; methods; synthesis of food ingredients, nutritional stress factors; and outlook on food applications. JV

- 2811 BENNIGSEN-MACKIEWICZ (AV). Weighing of flour in bulk during delivery. *Getreide Mehl. Brot.* 37(12); 1983; 368-72 (German)

- 2812 BECKER (F). Tasks and methods of the ascertainment and recording of the efficiency of managing processes in the food industry. *Lebensmittel-Industrie.* 30(4); 1983; 179-83 (German)

FOOD PROCESSING AND PACKAGING

PROCESSING

- 2813 TSUYUKI (H). Sterilization and preservation of foods by microwave heating. *J. Jpn. Soc. Food Sci. Technol.* 30(1); 1983; 55-62 (Japanese)
- 2814 SCHLEUSENER (H) and SIELAFF (H). Energy requirements and quality parameters for the sterilization process. *Lebensmittel-Industrie.* 30(4); 1983; 165-8 (German)

PACKAGING

- 2815 HENON (Y). Packaging and ionizing treatments of foods. *Ind. Aliment. Agric.* 100(10); 1983; 717-21 (French)
- Ionization treatment permits one to treat food products inside containers without generation of heat. However, it can be employed only if one keeps in mind its repercussions on the packaging material, and the constraints it places on them. The physico-chemical stability of the packed food varies with the food material and the ionization dose applied. Most foods do not suffer any significant change up to a dose of 10 kGy. If the purpose of ionization treatment is to destroy micro-organisms, either partially or totally, its effectiveness can be considerably improved by a judicious choice of the packaging technique. Regulations that will permit the utilization of this process in France are being formulated. KMD
- 2816 KEJRIWAL (SS). Packaging of horticultural produce. *Perfectpac.* 24(1); 1984; 5-11
- The article covers the extent of use of wood and corrugated fibre board boxes for packaging fruits and vegetables, especially mangoes, oranges, grapes, and apples. KMD.

FOOD ENGINEERING AND EQUIPMENT

- 2817 PETER (Von S). Separation by means of super critical fluids. *Fette Seifen Anstrichm.* 85(4); 1983; 135-42 (German)
- 2818 FOURNIER (P) and VANDIEVOET (AC). Rapid pre-refrigeration under vacuum - the meeting point of aeronautics and the agro-food industry. *Ind. Aliment. Agric.* 100(10); 1983; 691-5 (French)
- An enterprise specializing in the production of vacuum and ultra-vacuum has diversified its activity to the refrigeration and partial dehydration of vegetables by evaporation of water under vacuum. The harmful effects of post-harvest metabolism in vegetables have been described, alongwith various aspects of the technique of pre-refrigeration under vacuum. KMD
- 2819 ANON. New plant for heat recuperation of spray drying plants. *Fette Seifen Anstrichm.* 85(4); 1983; 172-4 (German)

- 2820 HOLZER (AJ). Robotics in the food industry. *Food Technol. Aust.* 36(4); 1984; 160-64

This paper explores the capabilities and limitations of industrial robots. The mechanical structure, the control system, programming issues and other important aspects especially relevant to the food industry are discussed. In particular, the flexibility of robots and hence their usefulness for order picking and other packaging tasks are described. A number of successful robotics applications in the food industry are reviewed. AA

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

- 2821 MILLER (JN). Recent developments in fluorescence and chemiluminescence analysis. *Analyst.* 109(3); 1984; 191-8
- 2822 NOVOTNY (M). Capillary separation methods: A key to high efficiency and improved detection capabilities. *Analyst.* 109(3); 1984; 199-206
- 2823 O'HAVER (TC). Continuum-source atomic-absorption spectrometry: Past, present and future prospects. *Analyst.* 109(3); 1984; 211-7
- 2824 MORENO (A), SILVA (M), PEREZ-BENDITO (D) and VALCARCEL (M). Fluorimetric semiautomatic catalytic titrations. *Analyst.* 109(3); 1984; 249-53
- 2825 BERRIDGE (JC) and ANDREWS (KS). Variable time - constant differentiation in chromatography. *Analyst.* 109(3); 1984; 287-9
- 2826 BERRIDGE (JC). Automated multiparameter optimisation of high-performance liquid chromatographic separations using the sequential simplex procedure. *Analyst.* 109(3); 1984; 291-3
- 2827 PIJPERS (FW). Failures and successes with pattern recognition for solving problems in analytical chemistry. *Analyst.* 109(3); 1984; 299-303
- 2828 PRUDNIKOV (ED) and SHAPKINA (YS). Random errors in analytical methods. *Analyst.* 109(3); 1984; 305-7
- 2829 COLLET (P). A contribution to the determination of nitrite and nitrate in foodstuffs. *Dtsch. Lebensmittel-Rundschau.* 79(11); 1983; 370-75 (German)
- Nitrite and nitrate in foodstuffs have been determined without any prior oxidation of nitrite, or reduction of nitrate. Thus, it is now possible to avoid the use of the toxic metal, cadmium. Nitrite and nitrate were both isolated from the sample extracts by means of ion-exchangers, and then determined by the Griess-Hosvay procedure or by the polarographic method respectively. This procedure permits detection of 1 mg of NO_3 and 0.2 mg of NO_2 per kg, using a 10 g sample of the food to be analysed. Nitrite and nitrate contents of over 900 samples of different kinds of foodstuffs have been

reported; they relate to 19 types of meat products, 8 types of fruits, 2 beverages (orange juice and beer), 5 types of milk products, 21 types of vegetables, and 3 types of cereals. KMD

FOOD LAWS AND REGULATIONS

Nil

FOOD MICROBIOLOGY

ENZYME

- 2830 WHITE (TJ), MEADE (JH), SHOEMAKER (SP), KOTHS (KE) and INNIS (MA). Enzyme cloning for the food fermentation industry. *Food Technol.* 38(2); 1984; 90, 92-5, 98

Cost savings and DNA modification to improve enzyme properties, particularly thermal stability are the benefits envisaged by the adoption of genetic engineering techniques. An important possible application is the cloning and the large scale production of enzymes to convert glucose into the sweetener - fructose. The cloning approaches and characterisation of genes of glycoamylase, exo-cellobiohydrolase and pyranose-2-oxidase isolated from filamentous fungi are discussed. JVS

- 2831 WASSERMAN (BP). Thermostable enzyme production. *Food Technol.* 38(2); 1984; 78, 80-89, 98

Five enzymes, namely, glucose isomerase, bacterial amylase, glucoamylase, rennets, papain and others have found wide spread uses. Enzyme development is hindered by high costs. In order to reduce the costs of producing and using them, microbial strain improvement, enzyme/cell immobilisation and stability enhancement are envisaged to be broad research areas. This article discusses: the structure-thermostability relationships, some types of thermostable enzymes needed by food industry and the current status of research. JVS

- 2832 HASHIMOTO (K), ADACHI (S), NOUJIMA (H) and UEDA (Y). A new process combining adsorption and enzyme reaction for producing higher-fructose syrup. *Biotechnol. Bioeng.* 25(10); 1983; 2371-93

- 2833 ROMETTE (JL), YANG (JS), KUSAKABE (H) and THOMAS (D). Enzyme electrode for specific determination of L-lysine. *Biotechnol. Bioeng.* 25(11); 1983; 2557-66

- 2834 TARHAN (L) and PEKIN (B). Immobilization of papain with acrolein-styrene copolymers containing carbonyl groups. *Biotechnol. Bioeng.* 25(11); 1983; 2777-83

MUSHROOM

- 2835 KAHN (V), GOLAN-GOLDHIRSH (A) and WHITAKER (JR). Evidence against superoxide involvement in tyrosine hydroxylation by mushroom tyrosinase. *Phytochemistry*. 22(9); 1983; 1875-83

- 2836 ZAKHARY (JW), EL-MAHDY (AR), ABO-BAKR (TM) and EL TABEY-SHEHATA (AM). Cultivation and chemical composition of the paddy-straw mushroom (*Volvariella volvaceae*). *Food Chem.* 13(4); 1984; 265-76

Seven different media were prepared for the cultivation of paddy straw mushroom, using local materials like orange juice waste, rice straw, bagasse, pea-canning waste, horse manure and molasses. The media containing orange juice waste, bagasse, rice straw, horse manure, molasses and urea gave the highest yields of mushroom (5.029 and 4.3 kg/m²). Of 14 amino acids present, 7 are essential amino acids, while methionine, arginine, histidine and serine are absent. KAR

ALGAE

- 2837 LAWS (EA), TERRY (KL), WICKMAN (J) and CHALUP (MS). A simple algal production system designed to utilize the flashing light effect. *Biotechnol. Bioeng.* 25(10); 1983; 2319-35

YEAST

- 2838 KLIBANSKY (MM), OTERO (MA) and GONZALEZ (LF). A new function for overall optimization of yeast production. *Biotechnol. Bioeng.* 25(11); 1983; 2493-502

- 2839 PANCHAL (CJ), RUSSELL (I), SILLS (AM) and STEWART (GG). Genetic manipulation of brewing and related yeast strains. *Food Technol.* 38(2); 1984; 99-106, 111

Discussion of: haploid/diploid life cycle of *Saccharomyces* sp., maltose genes in this organisms; effect of MAL and SUC gene dosage in isogenic triploid yeast strains (on wort fermentation rate and fermentation rate of 20% sucrose medium); tetrad analysis of 4-vinyl guaiacol formation by *Saccharomyces* sp; characteristics of fusion partners and fusion product; fermentation characteristics of *Saccharomyces* sp. JVS

SINGLE CELL PROTEIN

- 2840 BATT (CA) and SINSKEY (AJ). Use of biotechnology in the production of single-cell protein. *Food Technol.* 38(2); 1984; 108-11

The production of SCP is reported to be most amenable to manipulation. By optimising the different steps during production, yield improvement, productivity and quality can be obtained. This article mainly discusses: the production of SCP from *S. cerevisiae*, cellular lysis, and functional properties of SCP. JVS

BACTERIA

- 2841 ANDERSON (KL) and FUNG (DYC). Anaerobic methods, techniques and principles for food bacteriology: A review. *J. Food Prot.* 46(9); 1983; 811-22
Discusses: development of anaerobic cultivation systems; early developments-physical and mechanical reduction of oxygen; early developments - chemical and biological reduction of oxygen; early developments - indicators of oxidation and reduction; current anaerobic systems; collection of anaerobes from food samples; theoretical concepts attributing to oxygen sensitivity of anaerobes; and reducing agents and indicators. BSN
- 2842 GRIEME (LE) and BARBANO (DM). Method for use of a differential scanning calorimeter for determination of bacterial thermal death times. *J. Food Prot.* 46(9); 1983; 797-801
- 2843 ARMSTRONG (DW) and MARTIN (SM). Bacterial fermentation of cellulose: Effect of physical and chemical parameters. *Biotechnol. Bioeng.* 25(11); 1983; 2567-75
- 2844 KUNZ (B) and BLUMEL (W). Production of lyophilized cultures of propionibacterium for application in the food industry. *Lebensmittel-Industrie.* 30(4); 1983; 156-8 (German)

FOOD ADDITIVES

- 2845 KUHNERT (P). EEC numbers for more additives. *Gordian* 83(7-8); 1983; 145-7 (German)
The EEC numbers given to 133 substances that are added to foods for technological reasons have been reported. These numbers facilitate identification of the additives, but give no indication as to their permissibility in foods. KMD

TERTIARY BUTYL HYDROQUINONE

- 2846 KURECHI (T), AIZAWA (M) and KUNUGI (A). Studies on the antioxidants XVIII: Oxidation product of tertiary butyl hydroquinone (TBHQ). I. *J. Am. Oil Chem. Soc.* 60(11); 1983; 1878-82
- 2847 KURECHI (T) and KUNUGI (A). Studies on the antioxidants XIX: Photooxidation products of tertiary butyl hydroquinone (TBHQ). II. *J. Am. Oil Chem. Soc.* 60(11); 1983; 1882-7

COLORANTS

- 2848 STEELE (JA). High performance thin layer chromatography identification of synthetic food dyes in alcoholic products. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 540-41
Two additional solvent systems, namely mobile phase A (1-butanol-sec-butanol-acetonitrile-tetrahydrofuran-methyl ethyl ketone-water (0.5% NaCl) - ammonium hydroxide) and mobile phase B (1-propanol-acetonitrile-tetrahydro-

furan - methyl ethyl ketone - ethyl acetate - water (0.5% NaCl) ammonium hydroxide) have been used for the identification and improved resolution of synthetic food dyes in alcoholic products. JVS

- 2849 GIRI (AK), SRIVASTAVA (S), PANT (P) and BANERJEE (TS). Changes induced by Metanil Yellow and Blue VRS on bone marrow chromosomes of mice. *J. Food Sci. Technol. (India)* 21(1); 1984; 36-8

The effects of Metanil yellow and Blue VRS on the bone marrow chromosomes of mice were determined by dissolving in distilled water and injecting the dyes peritoneally at 50 mg/kg body weight for 24 hours (acute treatment) and by feeding the dyes forcibly at 2 mg/kg body weight - for 30 days (chronic treatment). Acute and chronic study of Metanil yellow and Blue VRS showed severe elastogenicity with significant increase in mitotic index in Metanil yellow acute treatment. But in Blue VRS, mitotic index did not show significant difference. Both the dyes showed chromosomal abnormalities. KAR

PECTIN

- 2850 UHLENBROCK (W). The gelling strength of pectins. *Gordian*. 83(7-8); 1983; 148-50 (German)

A technique of measuring the gelling strength of pectins has been described. It is based on existing methods and experiences, and makes it possible to carry out routine measurements with speed and certainty. KMD

PROPYLENE GLYCOL ALGINATE

- 2851 MOHAMED (SB) and STAINSBY (G). Ability of various proteins to form thermostable gels with propylene glycol alginate. *Food Chem.* 13(4); 1984; 241-55

ASPARTAME

- 2852 WEBB (NG) and BECKMANN (DD). Reverse phase liquid chromatographic determination of aspartame in beverages and beverage mixes. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 510-13

Beverages after being filtered through 0.45 μ m filters are directly injected into chromatograph. Aspartame (which has recently become popular as a substitute to the sweetener-saccharin) is separated on a specific column, employing a mobile phase consisting of acetic acid, water and isopropyl alcohol at pH 3.0 and UV detector at 254 nm. Aspartame is eluted in about 7 minutes and its detection is done by UV scan of trapped peak. JVS

- 2853 DANIELS (DH), JOE (FL) Jr., WARNER (CR) and FAZIO (T). Liquid chromatographic determination of aspartame in dry beverage bases and sweetener tablets with confirmation by TLC. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 513-5

The sample containing aspartame is mixed with a mobile phase, the pH adjusted to ± 0.1 of mobile phase, and the sample made up to volume with mobile phase. After filtration, the solution is passed through a C₁₈ reverse phase column. Quantitation of aspartame was done by using an UV detector (recovery 94-111%). JVS

CEREALS

- 2854 GENZKEN (K). Evaluation of milling properties by milling tests with different extraction ranges. *Getreide Mehl. Brot.* 37(12); 1983; 362-8 (German)
- 2855 BAKER (D). The use of toluene in fat acidity methods. *Cereal Food World.* 29(4); 1984; 265
 Wheat and corn samples were analysed for fat acidity using benzene and toluene as fat solvents respectively. The values for fat acidity by using either of these solvents were similar indicating that toluene could be used in place of benzene. JVS
- 2856 PERTEN (H). A modified falling-number method suitable for measuring both cereal and fungal alpha-amylase activity. *Cereal Chem.* 61(2); 1984; 108-11
 A modified falling number method which replaces 50% of wheat flour by a gelatinized wheat starch was used at 30 C for measuring cereal and fungal alpha-amylase activity. Data obtained from modified method for amylase activity were found to be highly correlated with the standard *et al* S(KB) values for both cereal and fungal alpha amylase activities. BSN
- 2857 MORRISON (WR) and LAIGNELET (B). An improved colorimetric procedure for determining apparent and total amylose in cereal and other starches. *J. Cereal Sci.* 1(1); 1983; 9-20
 An improved method for the colorimetric determination of amylose as its blue polyiodide complex is described. Starch is dissolved in urea - dimethylsulphoxide and aliquots of the solution are used to determine *apparent amylose* (measured in the presence of any amylose complexing monoacyl lipids which may be present) and *total amylose* (measured on lipid-free starch, precipitated from urea-dimethylsulphoxide solution with ethanol). When factors such as ionic concentration, sequence and timing of steps in the procedure and solution temperature are controlled, the coefficient of variation in replicate determinations ($N = 6$) is 0.2-1.0%, except with waxy starches, where it is 1.6-1.8%. The limitations of the method and sources of error in published methods for the preparation of lipid-free starches and in the development of stable amylose-polyiodide colour complexes are discussed. In some wheat and non-waxy rice starches, the difference between total and apparent amylose is 3.5-7.4% amylose. AA
- 2858 CHANDRASHEKAR (A) and DESIKACHAR (HSR). Studies on the hydration of starches flour and semolina from different cereal grains. *J. Food Sci. Technol.* (India) 21(1); 1984; 12-4
 Sorghum and wheat semolina were soaked at 50, 60 and 70 C in 0.1% aqueous solutions of (i) citric acid, (ii) tartaric acid, (iii) sodium carbonate (iv) ammonium carbonate, (v) magnesium chloride (vi) potassium iodate and (vii) papain and the cooking time was determined. Water uptake studies by flour and starches of jowar, maize, Italian millet, rice, bajra, ragi and wheat showed that at 50 and 60 C flours of all grains absorbed more water than corresponding starches, while at 70 C it was reversed. Semolina of wheat absorbed more water than that of sorghum at all temperatures. Extraction with butanol increased the hydration of sorghum and wheat semolina. Addition of tartaric, and citric acids or ammonium/sodium carbonates decreased cooking time in sorghum and wheat semolina. Magnesium chloride and potassium iodate showed no effect. It could be concluded that treating with papain increased water absorption more in sorghum than in wheat. KAR

RICE

- 2859 SOWBHAGYA (CM), RAMESH (BS) and BHATTACHARYA (KR). Improved indices for dimensional classification of rice. *J. Food Sci. Technol. (India)* 21(1); 1984; 15-9

The surface area/unit weight indicated earlier (*J. Agric. Engng.* 91, 1982, 69) as a criterion for classifying rice into superfine, fine, common and coarse classes, although theoretically valid, has certain practical limitations. Three other criteria proved satisfactory: normalized grain weight (low/L, mg/cm), grain weight (w) per unit breadth (B) - length (L) (WB/L, mg) and WB (mg.mm). Grain breadth (B, mm) and grain weight (W, mg) also gave rough indices. Of these, the index $10 w/L$ is simple and accurate. It is also a fundamental property of rice in as much as it (as well as the other four criteria) is highly significantly correlated with the water uptake by rice during cooking. L, L/B ratio and the amylose content are not correlated to water uptake. KAR

- 2860 FELLERS (DA) and DEISSINGER (AE). Preliminary study on the effect of steam treatment of rice paddy on milling properties and rice stickiness. *J. Cereal Sci.* 1(2); 1983; 147-57

Medium-grain Calrose paddy was adjusted to various moisture contents (14-26%), steamed at different pressures (13-32 psig), over a range of times (0-14 minutes), slowly dried, shelled and milled by a standard method on a pressure-type mill. A plot is shown that indicates the minimum paddy moistures and the minimum steaming pressures and times necessary to give 70% head yield (whole milled kernels) based on paddy; e.g., 14% moisture paddy steamed at 32 psig for 2 minutes. Steam treatments greatly reduced stickiness but increased yellowness. Both of these factors were shown to be affected by the degree of milling. These abbreviated parboiling treatments increased milling resistance resulting in undermilled rices and suggested the need for a more abrasive mill. Higher milling moistures increased bran removal and reduced head yield. AA

- 2861 INDUDHARA SWAMY (YM) and BHATTACHARYA (KR). Breakage of rice during milling. 5. Effect of sheller, pearler and grain types. *J. Food Sci. Technol. (India)* 21(1); 1984; 8-12

Paddy seeds harvested at early and late stages from three grain types (slender, medium and round) were milled using 3 kinds of shellers (i) rubber roller, (ii) centrifugal and (iii) metal-rubber roller and 3 types of pearl-ers emery roller, emery cone, and metal roller to determine the extent of breakage. Breakage during shelling was low with (i), but higher in (ii) and (iii) greater in medium and slender variety even in (i). Absolute breakage was more in late than in early harvested samples. Breakage during pearling was highest in brown rice obtained from (i) and least with (ii). It could be concluded that breakage of defective grains was less in (i) than in (ii), and (iii), in abrasion-type than in friction type pearl-ers, in round than in slender grain type and in low than in high degree of milling. KAR

- 2862 HIZUKURI (S), SHIRASAKA (K) and JULIANO (BO). Phosphorus and amylose branching in rice starch granules. *Starch.* 35(10); 1983; 348-50

Phosphorus content of rice starch granules prepared by DoBS extraction of milled rice protein was lowest and was mainly 6-phosphoglucose for 2 waxy rices. For 6 nonwaxy rices it was highest and predominantly phospholipid P based on choline content. Defatting with water-saturated butanol reduced

both choline and P content of nonwaxy rice starch. Once recrystallized amylose of 7 rices had 72-84% β -amylolysis limit, DP 532-793 glucose units per reducing end, CL 101-157 glucose units per nonreducing end and 3.4-7.5 branches/molecule. AA

- 2863 KIM (IH) and KIM (SK). Effects of phosphates differing in P_2O_5 contents on firming rate of cooked rice. *Cereal Chem.* 61(2); 1984; 91-4

The firming rate of cooked nonwaxy rice decreased with phosphates having P_2O_5 contents of 59.3 and 68%, the effect being more pronounced with those with 68% P_2O_5 - which also reduced firming rate by 25-40% depending on the rice variety. Phosphates did not exert any influence on firming rate of waxy rice. Phosphates decreased firming rate in cooked nonwaxy rice by reducing amounts of starch components available for crystallisation. BSN

WHEAT

- 2864 BIETZ (JA), BURNOUF (T), COBB (LA) and WALL (JS). Wheat varietal identification and genetic analysis by reversed-phase high-performance liquid chromatography. *Cereal Chem.* 61(2); 1984; 129-35

- 2865 WALTL (K). Production, marketing, and processing of wheat in Austria. *Getreide Mehl Brot.* 37(11); 1983; 323-6 (German)

The entire demand for wheat of the Austrian wheat milling industry is now being met by home-grown wheat. Legal provisions ensure uniform prices for grain and bread, and have helped to consolidate the Austrian wheat milling industry. The latter has now reached a very high technological level; it is very capital-intensive, and even the medium and small flour mills are modern and rationally designed. Interest in technological advances is still very great. KMD

- 2866 SVENSSON (G). Milling behaviour of wheat - its dependence on variety and environmental conditions. *Getreide Mehl Brot.* 37(11); 1983; 327-30 (German)

Breeding of wheat for improved milling quality had an early beginning in Sweden. For example, the famous Berg test, which is still used for plant selection, was published in 1947. Today, only hard wheats are permitted to be grown in Sweden, and the ratio of milling yield to bread volume is examined very critically. KMD

- 2867 DAVIS (AB) and EUSTACE (WD). Scanning electron microscope views of material from various stages in the milling of hard red winter, soft red winter, and durum wheat. *Cereal Chem.* 61(2); 1984; 182-6

- 2868 DAVIS (KR), PETERS (LJ), CAIN (RF), TOURNEAU (DLe) and MCGINNIS (J). Evaluation of the nutrient composition of wheat. III. Minerals. *Cereal Food World.* 29(4); 1984; 246-8

Wheat from five market classes with four subclasses of white wheat comprising 404 samples, 231 varieties, and representing three crop years and 49 growing locations were analyzed (dry weight basis) for calcium, copper, iron, magnesium, manganese, phosphorus, potassium and zinc content. In addition, chromium and selenium analyses were made on samples from one crop year. The mean contents of calcium, magnesium, phosphorus and potassium were 40, 133, 516 and 454 mg/100 g of wheat, respectively. For the trace

elements, average values for copper, iron, manganese, and zinc were 0.49, 7.9, 4.4 and 4.7 mg/100 g of wheat, respectively. There were significant differences among classes for all elements except iron. Hard red spring wheat had significantly more magnesium and zinc; hard red winter, significantly more calcium; soft white spring, significantly more potassium and copper; and hard red spring and hard white spring, significantly more manganese than the other classes of wheat. The mean contents of chromium and selenium were 56 and 7.4 $\mu\text{g}/100\text{ g}$, respectively. AA

2869 MILLER (BS), POMERANZ (Y) and AFEWORK (S). Hardness (texture) of hard red winter wheat grown in a soft wheat area and of soft red winter wheat grown in a hard wheat area. *Cereal Chem.* 61(2); 1984; 201-3

2870 BURT (DJ) and RUSSELL (PL). Gelatinization of low water content wheat starch - water mixtures. A combined study by differential scanning calorimetry and light microscopy. *Starch.* 35(10); 1983; 354-60

2871 KARLSSON (R), OLERED (R) and ELIASSON (AC). Changes in starch granule size distribution and starch gelatinization properties during development and maturation of wheat, barley and rye. *Starch.* 35(10); 1983; 335-40

The "large granules" are laid down in the earliest stage of development and increase in size during the ripening period, even after the appearance of the "small granules". In the mature grains, the proportion of small granules is larger in wheat and rye than in barley. The gelatinization temperature is lower for the mature starch than for starch from an early stage of development. The enthalpy for the gelatinization of the starch increases during development which indicates that the structure of starch granules changes as a result of ripening. The content of amylose-lipid complexes in the starch increases during development, partly depending on the increasing proportion of "small granules". AA

2872 FUJINO (Y) and OHNISHI (M). Sphingolipids in wheat grain. *J. Cereal Sci.* 1(2); 1983; 159-68

2873 BERESFORD (G) and STONE (BA). (1 $\rightarrow$ 3), (1 $\rightarrow$ 4)- β -D-glucan content of *Triticum* grains. *J. Cereal Sci.* 1(2); 1983; 111-4

2874 LAW (CN) and PAYNE (PI). Genetical aspects of breeding for improved grain protein content and type in wheat. *J. Cereal Sci.* 1(2); 1983; 79-93

Discusses: genetic systems operating with grain chromosomal organisation of wheat; and action of genes outside the grain. BSN

2875 NORRIS (KH) and WILLIAMS (PC). Optimization of mathematical treatments of raw near-infrared signal in the measurement of protein in hard red spring wheat. I. Influence of particle size. *Cereal Chem.* 61(2); 1984; 158-65

2876 FIELD (JM), SHEWRY (PR), BURGESS (SR), FORDE (J), PARMAR (S) and MIFLIN (BJ). The presence of high molecular weight aggregates in the protein bodies of developing endosperms of wheat and other cereals. *J. Cereal Sci.* 1(1); 1983; 33-41

Protein bodies have been isolated from developing grain of wheat, barley and rye. The protein has been solubilised in a solvent consisting of 0.01 M acetic acid, 6-M urea and 55-mM cetyltrimethylammonium bromide and chromatographed on columns of controlled pore glass. In each case, a proportion of the protein was eluted in the excluded volume of the column, indicating the

presence of multimeric aggregates in the protein bodies. In all three cereals, these aggregates contained an enhanced proportion of high molecular weight polypeptides and certain sulphur-rich prolamins. The proportion of aggregated material in wheat protein bodies was similar to that in gluten preparations and two-dimensional electrophoretic analyses showed that protein bodies and gluten consisted of almost identical polypeptides. AA

- 2877 PAYNE (PI), HOLT (LW) and LAWRENCE (GJ). Detection of a novel high molecular weight subunit of glutenin in some Japanese hexaploid wheats. *J. Cereal Sci.* 1(1); 1983; 3-8

- 2878 BATEY (IL). Chemical modification of lysine residues in wheat gluten with potassium cyanate. *J. Cereal Sci.* 1(1); 1983; 71-6

- 2879 WEHLING (RL), WETZEL (DL) and PEDERSEN (JR). Stored wheat insect infestation related to uric acid as determined by liquid chromatography. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 644-7

Liquid chromatography has been employed to estimate uric acid in wheat infested by granary weevil, rice weevil, and lesser grain borer. Number of insects in the grain and its uric acid content showed good correlation. The method is very sensitive. JVS

- 2880 SINHA (RN). Effects of stored-product beetle infestation on fat acidity, seed germination, and microflora of wheat. *J. Econ. Entomol.* 76(4); 1983; 813-7

The keeping quality of wheat and wheat plus dockage, which was infested by two stored product beetles, *Oryzophilus surinamensis* and *Cryptolestes ferrugineus* at 30 C and 70% RH was determined over 20-week period. Heavy infestation by both insect species resulted in significantly higher levels of infection by *Penicillium* and bacteria, which led to greater loss in seed germination, fat acidity values in seed plus dockage treatment increased significantly only when it was infested with *O. surinamensis*. KAR

- 2881 LOSCHIAVO. (SR). Distribution of the rusty grain beetle (Coleoptera: Cucujidae) in columns of wheat stored dry or with localized high moisture content. *J. Econ. Entomol.* 76(4); 1983; 881-4

Adults of the rusty grain beetle, *Cryptolestes ferrugineus* (Stephens), moved downward after being placed at the top of 125- or 250-cm-high columns of wheat at 13 or 13.4% moisture content. From the first to the third day, most beetles were near the top of the column, but after 3 days most were found near the bottom. The number near the bottom increased over time. Beetle distribution in columns stabilized between the third and fifth day. Conversely, from 80 to 92% of the beetles aggregated at the top or middle zones of the column when wheat of 16 to 17% moisture content was placed only in these zones. Beetle distribution in the moist zones became stable within 3 days. AA

- 2882 OMAE (ST) and CHOW (FI). Comparison between meal-eating and nibbling rats fed diets containing hard red spring wheat bran: Bioavailability of vitamins A and E and effects on growth. *Cereal Chem.* 61(2); 1984; 95-9

- 2883 NOWOTNY (P), BALTES (W), KRONERT (W) and WEBER (R). Determination of ochratoxin A in wheat bran with HPLC. *Chem. Microbiol. Technol. Lebensmittel.* 8(1); 1983; 29-31 (German)

An acidic extraction is followed by clarification by means of Carrez solutions and defatting with n-hexane. Then ochratoxin A is extracted with dichloromethane. After high performance liquid chromatography using a RP-18 column, ochratoxin A is quantified with a fluorescence detector. The detection limit is 5 ppb, the mean recovery about 75% in wheat bran. 22 commercial products of wheat bran were analyzed, but in none of them ochratoxin A could be detected. AA

TRITICALE

- 2884 GLATTES (H) and MAR (A). Triticle in practical milling and baking. 1. Milling tests. *Getreide Mehl Brot*. 37(12); 1983; 359-62 (German)
- When "Lasko" triticale, harvested in 1982 and in 1983, was subjected to large-scale milling tests (10 tonnes/24 hours), it exhibited a "rye-like" milling behaviour, and it was possible to classify the flours as different types of Austrian rye flour (ash content 500, 960, 2500). It is difficult to produce light-coloured flours, and sticky doughs. The practical baking test proved to be suitable for evaluation of triticale flours. KMD

OAT

- 2885 URQUHART (AA), BRUMELL (CA), ALTOSAAR (I), MATLASHEWSKI (GJ) and SAHASRABUDHE (MR). Lipase activity in oats during grain maturation and germination. *Cereal Chem.* 61(2); 1984; 105-8
- 2886 KAROW (RS), FORSBERG (RA) and PETERSON (DM). A comparison of two rapid oat lipid extraction procedures in terms of fatty-acid profile. *Cereal Chem.* 61(2); 1984; 196-7

MILLETS

MAIZE

- 2887 POMERANZ (Y), MARTIN (CR), TRAYLOR (DD) and LAI (FS). Corn hardness determination. *Cereal Chem.* 61(2); 1984; 147-50
- Breakage susceptibility and kernel hardness as measured by density, near-infrared reflectance, and average particle size of ground material were determined for four groups of corn samples. The groups were isogenic pairs with regard to hardness (dent and flint), commercial dent hybrids, dent corn heat-dried under various conditions, and a group that varied in starch composition (waxy, regular, high amylose) and in protein, oil, and ash contents. Density, near-infrared reflectance, and average particle size values were highly, linearly, and positively correlated provided homogenous groups were analyzed and evaluated. In samples that were highly susceptible to breakage, correlation coefficients of hardness determination increased when calculations were made on the basis of constant breakage susceptibility. The three methods of hardness determination were equally sensitive and useful in routine analyses. AA

- 2888 WALL (JS), FEY (DA) and PAULIS (JW). Improved two-dimensional electrophoretic separation of zein proteins: Application to study of zein inheritance in corn genotypes. *Cereal Chem.* 61(2); 1984; 141-6
- 2889 COLONNA (P), MELCION (J-P), VERGNES (B) and MERCIER (C). Flow, mixing and residence time distribution of maize starch within a twin-screw extruder with a longitudinally-split barrel. *J. Cereal Sci.* 1(2); 1983; 115-25
A longitudinally-split barrel was used to study the internal modifications of maize starch during extrusion-cooking in a Creusot-Loire BC-72 twin-screw extruder. After steady state conditions were obtained, the extruder barrel was dismantled and samples were taken at points along the screws in order to study changes in starch granular structure and macromolecular levels in the different phase transition zones. Mass transport is the predominant process in the extruder before the reverse flight section where comminution is the major event. In this reverse flight zone, starch granules are progressively sheared and melted. Shear along the barrel surface causes rapid cooking, with the formation of a glassy phase. The results show that the combined effect of shear, together with heat and pressure, are mainly responsible for starch modifications. The residence time distribution is a function of extruder size. AA
- 2890 WARTHESEN (JJ). Analysis of saccharides in low-dextrose equivalent starch hydrolysates using high-performance liquid chromatography. *Cereal Chem.* 61(2); 1984; 194-5
The saccharide profile of corn syrup solids and maltodextrins may be determined up to DP 10 within 21 minutes, when a commercially available, prepacked column is employed. In low-DE samples, problems with quantitation by area normalization may be encountered, but saccharide measurement may be improved by use of standards for DP 1, 2 and 3. ESN
- 2891 EGGUM (BO), DUMANOVIC (J), MISEVIC (D) and DENIC (M). Grain yield and nutritive value of high oil, opaque and waxy maize hybrids. *J. Cereal Sci.* 1(2); 1983; 139-45
Grain yields, chemical compositions and protein qualities were measured for 11 maize varieties (four high oil, four opaque, two waxy, one normal) cultivated in Yugoslavia. Protein quality assessment was based on amino acid composition, and true protein digestibility, biological value, net protein utilisation and utilisable protein were determined in nitrogen balance experiments with rats. The protein concentration in dry matter varied from 8.63 to 11.88% while the fat concentration varied from 4.84 to 8.19%. There were only minor differences in starch+sugar, ash and crude fibre. Lysine levels were approximately 30% higher for the opaque varieties compared with normal maize, while leucine levels were about 30% lower. Yields were extremely high for all varieties with the highest value being 15.5 tonnes/hectare. Even though the protein concentrations were relatively low, all varieties produced more than 1000 kg protein/hectare, the highest value being 1847 kg/hectare. This resulted in high yields of amino acids/hectare. Protein utilisation was very high in the opaque varieties, which had the highest lysine contents. The biological values were close to 80 in these varieties, whereas they were only 60 in the normal maize variety. AA
- 2892 HAN (YM), CHO (YK) and CIEGLER (A). Effect of gamma-ray irradiation on alcohol production from corn. *Biotechnol. Bioeng.* 25(11); 1983; 2631-40

POPCORN

- 2893 HOSENEY (RC), ZELEZNAK (K) and ABDELRAHMAN (A). Mechanism of popcorn popping. *J. Cereal Sci.* 1(1); 1983; 43-52

During the popping of popcorn, the pericarp acts as a pressure vessel. It was found that the initial break in the pericarp affects popped volume more radically than do any subsequent breaks. Popping occurs at about 177 C, which is equivalent to a pressure of 135 psi inside the kernel. Most of the water in the kernel is superheated at the moment of popping and provides the driving force for expanding the kernel once the pericarp ruptures. At temperatures below 177 C, the proportion of kernels that have popped declines markedly. The scanning electron microscope was used to document changes occurring in the kernel as a result of popping. In the translucent endosperm, the superheated water appears to vaporize into the hilum, expanding the starch to a thin film. In the opaque endosperm, large voids are produced and the starch granules remain birefringent. The voids around the starch provide an alternative site into which the superheated water vaporizes. Thus, the starch granules are not expanded and retain their birefringence. AA

PEARL MILLET

- 2894 KACED (I), HOSENEY (RC) and VARRIANO-MARSTON (E). Factors affecting rancidity in ground pearl millet (*Pennisetum americanum* L. Leeke). *Cereal Chem.* 61(2); 1984; 187-92

SORGHUM

- 2895 CAGAMPANG (GB) and KIRLEIS (AW). Relationship of sorghum grain hardness to selected physical and chemical measurements of grain quality. *Cereal Chem.* 61(2); 1984; 100-105

Selected physical and chemical measurements were used to determine grain quality of 15 sorghum cultivars differing widely in degree of grain hardness (endosperm texture). All assays were done on pearled grains. Results of the modified adhesion test, Instron back-extrusion test, alkali gel stiffness test, and weight ratio of cooked to uncooked grain were strongly correlated with grain vitreousness. The alkali disintegration test and microamylograph viscosities (peak and hot paste) were significantly, but weakly correlated with grain vitreousness. Fats, ash, total sugars, soluble and kafirin proteins, and amylose content had some association with grain vitreousness. AA

- 2896 HEMMERLY (TE). Traditional method of making sorghum molasses. *Econ. Bot.* 37(4); 1983; 406-9

The saccharum group of *Sorghum bicolor* cultivars have sweet juicy stems and are used for making a syrup or molasses. One such plant is sorgo or sweet sorghum. The stalks, of mature plants are crushed in a horse driven mill. The juice is boiled; the foam is skimmed with a metal shovel and the boiling liquid is stirred and raked. When syrupy consistency is reached the product (molasses) is drawn off. The syrup is passed through cheese cloth, cooled and filled into tins for sale. JVS

- 2897 EGGUM (BO), MONOWAR (L), BACH KNUDSEN (KE), MUNCK (L) and AXTELL (J). Nutritional quality of sorghum and sorghum foods from Sudan. *J. Cereal Sci.* 1(2); 1983; 127-37

The nutritional quality of whole and decorticated sorghum grains (Tetron, Dabar, Feterita) from Sudan, and various dishes prepared from sorghum, was determined in rat balance tests. From these tests it is concluded, that sorghum is low in lysine, and, therefore, has a low biological value. On the other hand, the true digestibility of protein, as well as digestible energy, is very high with values about 90%. True digestibility of the protein decreased when a porridge (ugali) was cooked from the variety Dabar (low polyphenol), but there was an increase in biological value compared with the raw grain. These changes were eliminated if the pH was adjusted to 3.9 before cooking. These effects of cooking were much more pronounced for the variety Feterita (high polyphenol). In pancakes (Kisra) fermented at pH 3.9, there were only minor effects on the nutritional quality due to cooking for all sorghum varieties studied. Cooked, fermented and cooked, unfermented, acid-adjusted Aceda (a thin fermented gruel) had slightly lower digestible energies and lower true protein digestibilities, but higher biological values, than uncooked, fermented Aceda, showing that the protective effect of acidification observed with Ugali did not occur with Aceda. Marissa, a sorghum beer, had a higher biological value after sieving than did the unsieved brew but true protein digestibility was negatively affected by Marissa preparation. AA

- 2898 MacLEAN (WC), Jr., LOPEZ DE ROMANA (G), GASTANADUY (A) and GRAHAM (GG). The effect of decortication and extrusion on the digestibility of sorghum by pre-school children. *J. Nutr.* 113(10); 1983; 2071-7

It was brought out that the use of decortication and low cost extrusion processing can markedly improve the apparent protein quality and digestibility of sorghum. KAR

- 2899 DADA (LO) and MULLER (HG). The fate of aflatoxin B₁ in the production of ogi, a Nigerian fermented sorghum porridge. *J. Cereal Sci.* 1(1); 1983; 63-70

Nigerian sorghum was inoculated with spores of *Aspergillus flavus* and incubated until mould growth was observed. The grain was then ground and sieved. The meal, containing 2333 µg/kg of aflatoxin B₁, was then mixed with uncontaminated material to give two samples containing 200 and 800 µg/kg of aflatoxin. In another set of experiments, different levels of pure aflatoxin B₁ were used to treat the grain. All samples were then processed into ogi, which is the most important traditional weaning food for babies in Nigeria. With fungal contamination, 33% of the aflatoxin was found in the ogi after processing. With the grain contaminated with pure aflatoxin, 26% was recovered. In both instances, traces of the less toxic aflatoxin B_{2a} were found. The addition of boiling water to the ogi to produce the porridge resulted in a further aflatoxin loss of about 3%. AA

PULSES

- 2900 DUNCAN (A), ELLINGER (GM) and GLENNIE (RT). Determination of methionine by gas-liquid chromatography: Modifications in its application to legumes and cereals. *J. Sci. Food Agric.* 35(4); 1984; 381-4

Reaction of methionine bound to peptide with CNBr releases methyl thiocyanate which is quantitatively measured by employing GLC. Seeds of certain

legumes contain gamma glutamyl-S-methyl cysteine which also reacts with CNBr to give high methionine values. An extraction procedure was developed for its removal. The methionine values obtained corresponded with those obtained by using ion exchange chromatography after performic acid oxidation. In the case of cereals, a preliminary acid hydrolysis reduced the formation of gel during CNBr reaction and allowed the GC method for methionine determinations. JVS

COW PEA

- 2901 REDDEN (RJ) and MCGUIRE (J). The genetic evaluation of bruchid resistance in seed of cow pea. *Aust. J. Agric. Res.* 34(6); 1983; 707-15

FIELD PEA

- 2902 TYLER (RT) and PANCHUK (BD). Effect of seed maturity on the air classification of field peas. *Cereal Chem.* 61(2); 1984; 192-3

FRENCH BEAN

- 2903 GATEHOUSE (AMR), DEWEY (FM), DOVE (J), FENTON (KA) and PUSZTAI (A). Effect of seed lectins from *Phaseolus vulgaris* on the development of larvae of *Callosobruchus maculatus*: Mechanism of toxicity. *J. Sci. Food Agric.* 35(4); 1984; 373-80

Purified lectins obtained from the seeds of *P. vulgaris* proved to be toxic to *C. maculatus* larvae. The mechanism of toxicity appeared to consist in the binding of ingested lectin molecules to the mid gut epithelium of the larvae adversely affecting the cell surfaces (through disruption) and thereby allowing for the absorption of harmful substances related to lectin or originating from bacteria. JVS

GREEN BEAN

- 2904 BAUMGART (J), HINRICHS (M), WEBER (B) and KUPPER (A). Spoilage and swell of canned green beans by *Bacillus stearothermophilus*. *Chem. Microbiol. Technol. Lebensmittel.* 8(1); 1983; 7-10 (German)

A catalase negative strain of *Bacillus stearothermophilus* able to develop nitric oxide out of the nitrate dissolved in the fluid of the beans was isolated from spoiled canned green beans with soft swell. The characteristics of the isolated strain were identical with those of *Bacillus stearothermophilus* ATCC 120 16 except for the minimal temperature of growth. The heat resistance of the spores determined in the fluid of the beans was fixed at $D_{121\text{ C}} = 0.65$ minutes, in phosphate buffer at $D_{121\text{ C}} = 2.0$ minutes. AA

WHITE BEAN

- 2905 HUTCHINSON (DH) and OTTEN (L). Equilibrium moisture content of white beans. *Cereal Chem.* 61(2); 1984; 155-8

WINGED BEAN

- 2906 KING (RD) and PUWASTIEN (P). Effect of blanching and soaking on winged bean (*Psophocarpus tetragonolobus*). *J. Sci. Food Agric.* 35(4); 1984; 441-6
 Blanching helped in water uptake, and absorption of total water; the percentage of rehydrated beans increased during cooking. Blanching decreased the protein solubility of flour, inactivated most of lipoxigenase and produced little effect on trypsin inhibitor activity. JVS

OILSEEDS AND NUTS

- 2907 LUSAS (EW). Comparative processing practices of the world's major oilseed crops. *Econ. Bot.* 37(4); 1983; 444-58
 Review; discusses the magnitude of production of cottonseed, peanut, sunflower and rapeseed in the world, acceptability of oilseeds to various climates, the infrastructure and role of cottonseed, peanut, soyabeans, sunflower, rapeseed, sesame in the economy of U.S.A. Processing of oils and their utilisation, fatty acid composition of these oils, and nutritional qualities of oilseed meal/products. JVS
- 2908 PRINCEN (LH). New oilseed crops on the horizon. *Econ. Bot.* 37(4); 1983; 478-92
 Discusses long chain fatty acid crops (*crambe*, *Limnanthes alba* and *Lunaria annua*), medium chain fatty acid crops (18 species of *cuphea*, members of *Lauřaceae* and *Stakesia laevis*), liquid wax ester sources (*Jojoba*) and new vegetable oils for energy (*Sapium sebiferum*). Recent estimates reveal that the yield of *S. sebiferum* seeds could be as much as 10,000 lb per acre. At 40% seed level this can yield about 4000 lb per acre of hydrocarbon-like fuel
 JVS

COTTONSEED

- 2909 MARSHALL (HF), SHIRER (MA) and CHERRY (JP). Characterization of glandless cottonseed storage proteins by sodium dodecyl sulphate-polyacrylamide gel electrophoresis. *Cereal Chem.* 61(2); 1984; 166-9

SOYABEAN

- 2910 HYMOWITZ (T) and HARLAN (JR). Introduction of soyabean to North America by Samuel Bowen in 1765. *Econ. Bot.* 37(4); 1983; 371-9
 The soyabeans were first planted in Georgia in 1765. It was brought from China. In 1766, it was grown in plantations. The soybeans were used to make soy sauce and vermicelli. In addition a sago powder substitute was also prepared. The three products were then sent to England. JVS
- 2911 KATSUTA (K) and HAYAKAWA (I). Viscoelastic behaviour and spinnabilities of low concentration soy protein dope. *J. Jpn. Soc. Food Sci. Technol.* 30(1) 1983; 20-24 (Japanese)
 Viscoelastic behaviour and spinnabilities of low concentration soy protein dope (10-14%) were investigated in order to understand the spinning

mechanism. A 14% dope with pH 8.6 showed spinnability (20 m/minute). The results suggested that colloidal corpuscles of protein could be oriented into thread-form materials like connected beads when the dope was passed throughout the spinning nozzle. Viscoelastic behaviour of the dope largely changed around pH 11. In proportion to alkali treatment, the viscoelastic value of the dope increased slowly and frequency of G for the dope reduced gradually up to pH 11. But, on the contrary, the viscoelastic of the dope decreased and frequency dependence of G for the dope increased when pH was higher than 11. It was found that the pattern of alkali denaturation was not dependent on the soy protein concentration, but viscoelasticities of the dope were influenced by the protein concentration. When -carrageenan was added into the dope that could not be spun, the dope changed into good spinnable one and the fiber of excellent quality was produced. AA

- 2912 YAMANO (Y), SAKAMOTO (K) and MUKAI (K). ESR analysis of microstructure of soyabean protein-palm-oil water gel. *J. Jpn. Soc. Food Sci. Technol.* 30(1); 1983; 48-50 (Japanese)

Microstructure of soyabean protein gel containing palm oil was analyzed by electron spin resonance by using nitroxide free radicals -Tempo and tempol, as spin probes. The determination of isotropic hyperfine coupling constant values indicated that this gel had a regular structure consisting of hydrophilic and hydrophobic circumstances. Correlation time analysis showed that microviscosity of aqueous phase increased with an increase of the added oil amount. This tendency is very similar to that of the increase of hardness of the gel with increasing oil content. These results suggest that spin probe method is for studying the microstructure and hardness of soybean protein-oil-water gel. AA

- 2913 LOTONG (N) and SUWANARIT (P). Production of soy sauce koji mold spore inoculum in plastic bags. *Appl. Environ. Microbiol.* 46(5); 1983; 1224-6

An innovation is described for producing soy sauce koji mold spore inoculum by using inexpensive autoclavable plastic bags and reuseable plastic enclosures to make culture vessels. After growth, the spore mass could be dried and packaged in the same bag after removing the enclosure. Broken rice was used as the substrate for mold cultivation. Viable spore counts of 10^9 spores per g were obtained under optimal conditions. After drying at 50 C for 6 hours, the moisture content of the spore mass decreased from 35.22 to 6.32% with no significant effect on spore viability. The dry spores could be stored in the refrigerator or at room temperature for at least 3 months. AA

COCONUT

- 2914 PATIL (RT). Copra drier using agricultural waste as fuel, for use by small-holders. *Oleagineux.* 38(10); 1983; 561-2

A small and easily transportable copra drier, with a processing capacity of 400 nuts has been described. It costs Rs. 800/- and functions with all types of agricultural waste (husks, shells, etc.). KMD

- 2915 KINDERLERER (JL). Spoilage in desiccated coconut resulting from growth of xerophilic fungi. *Food Microbiol.* 1(1); 1984; 23-8

Two distinct types of fungi *Eurotium amstelodami* Mangin, *Eurotium herbariorum* Link ex Gray and *Penicillium Citrinum* causing ketonic type spoilage and cheesy butyric due to growth of an as yet unidentified hyphomycete CMI number 276864 have been observed in desiccated coconut. KAR

GROUNDNUT

- 2916 BLOOME (PD), KLETKE (DD) and SHOLAR (JR). Comparisons of on-farm peanut drying systems in the Southwest. *Peanut Sci.* 10(2); 1983; 69-72

Costs were determined as average present value costs per tonne using a 15-year planning horizon. The systems compared and their average present values of net, after tax, cash outflows were: high capacity, heated air drying - \$16.50/tonne; low temperature, controlled humidity drying - \$23.07/tonne; fan-powered, natural air drying - \$20.88/tonne; wind-powered, natural air drying in field modules - \$22.15/tonne, and sack drying in the field - \$28.60/tonne. Costs for the wind-powered, field module system were reduced to \$18.00/tonne by Federal Energy Tax Credits (15%) and further reduced to \$9.70/tonne by Oklahoma Energy Tax Credits (30%). AA

- 2917 SMITH (JS) Jr., DAVIDSON (JI) Jr., SANDERS (TH), LANSDEN (JA) and COLE (RJ). Changes in the temperature profile of farmers stock peanuts during storage. *Peanut Sci.* 10(2); 1983; 88-93

Thermocouples were positioned at similar locations in the peanut mass in two typical flat-type-metal building peanut warehouses, one mechanically ventilated and the other naturally ventilated. Temperatures were recorded 12 times daily for each location during a 9-month storage period. Temperature profiles were constructed for selected times throughout storage. Generally, the isotherms composing the profiles were similarly shaped for like periods. The mechanically ventilated warehouse maintained a mean temperature of 1 to 4 C less than the naturally ventilated warehouse throughout most of the storage period. AA

- 2918 WILSON (DM) and STANSELL (JR). Effect of irrigation regimes on aflatoxin contamination of peanut pods. *Peanut Sci.* 10(2); 1983; 54-6

Florunner and Florigiant peanuts were grown and foliar inoculated with an aflatoxin producing isolate of *Aspergillus parasiticus* (NRRL 2999) 30 days after planting. Four replicates were grown in plots under rainfall controlled shelters with six irrigation treatments: (1) wet from day 0-145, (2) dry from days 36-70, (3) dry from days 71-105, (4) dry from days 106-145, (5) dry from days 36-105, (6) dry from days 71-145. Aflatoxin concentrations from Florunner peanuts were significantly different between treatments ($P = 0.01$) in 1974 and 1976, but not in 1975 or 1977. In 1974 and 1976, sound mature kernels of Florunner from treatments 4 and 6 contained significantly more aflatoxin when compared to other treatments. Aflatoxin contamination of Florigiant sound mature kernels from treatments 4 and 6 in 1975 and treatment 6 in 1974 was significantly greater ($P = 0.01$) than other treatments, but not in 1977. No data were taken in 1976 for Florigiant peanuts. Water stress during the last 40 to 75 days of the season contributed to aflatoxin contamination of sound mature kernels, three of the four years on one or both cultivars. Because of year to year variation, drought stress alone does not consistently affect field aflatoxin contamination. In some years, other environmental factors must have interacted with drought stress to promote or inhibit preharvest aflatoxin contamination. However, in all treatments where irrigation was applied during the last 40 days of the season no significant aflatoxin contamination was detected in any cultivar any year of the test. AA

- 2919 WHITAKER (TB) and DICKENS (JW). Comparison of the amounts of aflatoxin extracted from raw peanuts using AOAC methods I and II. *Peanut Sci.* 10(2); 1983; 52-4

Four lots of raw shelled peanuts, naturally contaminated with aflatoxin, were each ground into a paste. Sixty-four 50-g samples were removed from three of the lots and forty 50-g samples were removed from the fourth lot. For each lot, aflatoxin was extracted from half of the samples by the AOAC Method I (CB) and from the remaining half by the AOAC Method II (BF). The 4 lots averaged 57.8, 127.6, 238.5, and 447.1 parts per billion (ppb) total aflatoxin when measured by the CB method. On the average across the four lots, the BF method extracted 26, 25, 22, and 18% less aflatoxin B1, B2, G1, and G2, respectively, than the CB method. AA

- 2920 CONKERTON (EJ) and ORY (RL). Chemical and functional properties of peanut and rice bran flour blends. *Peanut Sci.* 10(2); 1983; 56-8

Blends of peanut and rice bran flours in 1:3, 1:1, and 3:1 ratios had different protein solubility than the original materials. Methionine lysine, available lysine, hydration capacity, and fat absorption increased as the amount of rice bran increased. Emulsifying capacity and emulsion stability were highest in all blends. AA

TUBERS AND VEGETABLES

ONION

- 2921 LANCASTER (JE), McCALLION (BJ) and SHAW (ML). The levels of S-alk(en)yl-L-cysteine sulphoxides during the growth of the onion (*Allium cepa* L.). *J. Sci. Food Agric.* 35(4); 1984; 415-20

The quantity of flavour precursors of onion, namely, S-alk(en)yl-L-cysteine sulphoxide changes during the growth stages. A major precursor and 2 minor precursors have been identified in 2 varieties of onions (Pukekohe Long Keeper (PLK) and white onion cultivar Dehyso). The total amount of three flavour precursors per bulb of 2 varieties of onion were found to be maximum (360 mg for PLK and 602 mg for Dehyso), in January and got reduced in subsequent months. The results suggest that harvesting of white onions from bulbing onwards would be advantageous for purposes of drying and processing. JVS

POTATO

- 2922 KLEIN (LB), CHANDRA (S) and MONDY (NI). The effect of maleic hydrazide treatment on nitrogenous constituents of potato tubers and on mineral changes in tubers and sprouts. *J. Food Biochem.* 8(1); 1984; 55-66

The effect of maleic hydrazide treatment on the contents of total and non-protein nitrogen, protein and minerals was assessed on cortex and pith tissues of two potato varieties (Katahdin and Kennebec) grown at two locations (Long Island and Ithaca, NY). Maleic hydrazide significantly increased ($P < 0.01$) the total and non-protein nitrogen of cortex tissue but showed no significant effect on protein and mineral contents. Sprouts and bud tissue from Katahdin and Kennebec tubers grown at Ithaca were assessed for mineral

composition. In both varieties the amounts of calcium, magnesium, manganese and zinc in sprouts were significantly increased ($P < 0.01$) by maleic hydrazide treatment. No significant effect of MH on mineral content of bud tissue was observed. AA

- 2923 MICA (Von B). Effect of fertilization of potatoes on molecular weight of starch. *Starch*. 35(10); 1983; 360-63 (German)

- 2924 HAYASHI (T) and KAWASHIMA (K). Impedance measurement of irradiated potatoes. *J. Jpn. Soc. Food Sci. Technol.* 30(1); 1983; 51-4

The impedance ratio of a potato tuber at 50kHz to 5kHz (Z_{50k}/Z_{5k}) was dependent upon the irradiation dose, while it was independent of the locality where potatoes were grown. It remained constant during the storage after irradiation. The impedance ratio for unirradiated potatoes was almost the same, irrespective of the potato variety. The possibilities of differentiation between unirradiated and irradiated potatoes and estimation of irradiation dose were discussed based on the results. AA

- 2925 LUTHER (H), WEBER (E) and SCHUSTER (E). Processing of potato press juice. 1. Separation of potato protein from press juice. *Lebensmittel-Industrie*. 30(4); 1983; 169-72

SWEET POTATO

- 2926 WATANABE (A), BABA (T), OHTANI (T) and YASUI (A). Scald peeling of sweet potatoes and taroes in hot chloride solution. *J. Jpn. Soc. Food Sci. Technol.* 30(1); 1983; 1-7 (Japanese)

Scald treatment by submerging potatoes in hot calcium chloride solution was applied for peeling of sweet potatoes and taroes and it was demonstrated that this treatment was effective in terms of peeling yield and qualities. In the case of sweet potatoes, adequate scalding condition was in the range of temperature, 130~140 C, and time, 2.5~3 minutes, for submerging in CaCl_2 solution. The peeling loss was only about 8.5%. The peeled product had a good appearance and colour, and discolouration of that was less than product peeled by alkaline solution. The peeling efficiency was influenced by the variety, the season of harvest and the storage period. In the case of taroes, an adequate scalding condition was to submerge in CaCl_2 solution at 120~130 C for 2~3 minutes and peeling loss was about 12%. AA

- 2927 THOMPSON (DP). Composition of sweet potato cultivars at harvest time. *J. Food Sci. Technol.* (India) 21(1); 1984; 43-4

15 cultivars of freshly harvested sweet potatoes were analyzed for pH, total acidity, total solids, moisture content, carotenoid content, total phenols and orthodihydroxyphenols. Variations in mean measurements of the analyses were: pH 5.10-5.80, total acidity (as citric acid) 0.064-0.268%, total solids 24.0-34.6%, moisture content 65.3-75.8%, carotenoid 2.3-32.7 mg, total phenols 22.0-76.0 mg, and orthodihydroxyphenols 10.4-36.4 mg/100 g fresh tissue. KAR

CASSAVA

- 2928 LAKSHMI (KR). Marketing of cassava. *Indian Farming*. 34(1); 1984; 27-8, 40

Marketable surplus of cassava is given. KAR

- 2929 RAO (PV) and HAHN (SK). An automated enzymic assay for determining the cyanide content of cassava (*Manihot esculenta* Crantz) and cassava products. *J. Sci. Food Agric.* 35(4); 1984; 426-36

The method enables 300 analysis per day. Besides, free and bound cyanides can also be assayed in extracted solutions. JVS

- 2930 NAMBISAN (B) and SUNDARESAN (S). Spectrophotometric determination of cyanoglucosides in cassava. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 641-3

The cyanoglucoside (CNG) from cassava is extracted in 80% ethanol; after evaporating ethanol, CNG in the extract is incubated with linamarase, at pH 6 for 15 minutes at 30 C. Then the solution is treated with NaOH, neutralised; cyanide is determined by the addition of chloramine T and barbituric acid-pyridine reagent and subsequent measurement of absorbance at 5.70 nm. The detection limit of cyanide in the assay is 0.1 mcg/ml. JVS

CYPERUS ESCULENTUS

- 2931 ADDY (ED) and ETESHOLA (E). Nutritive value of a mixture of tigernut tubers (*Cyperus esculentus* L.) and baobab seeds (*Adansonia digitata* L.). *J. Sci. Food Agric.* 35(4); 1984; 437-40

The tubers of *C. esculentus* is used as a vegetable in Nigeria, while baobab seeds are employed as flavours of soups. The composition of *Cyperus* tubers and baobab seeds respectively are as follows: digestible carbohydrates, 47.9% and 24.1%; oil 32.8% and 29.7%; and crude proteins, 3.8% and 28.4%. A mixture consisting of 3 parts of *Cyperus* and 1 part of baobab seeds was prepared to contain 10% crude protein. The chemical score based on limiting amino acids (those containing sulphur) was 51%. The level of antinutritive substances was reduced by soaking and cooking. JVS

TOMATO

- 2932 CRIVELLI (G) and MAESTRELLI (A). Freezing of tomatoes: possibility and limits of obtaining a peeled and quick-frozen diced product. *Ind. Aliment.* 22(9); 1983; 609-11 (Italian)

Processes for the preparation of quick-frozen or freeze-dried diced tomatoes from whole fruit or from macerated fruits and concentrated juice have been described in outline. KMD

- 2933 MOSHREFI (M) and LUH (BS). Purification and characterization of two tomato polygalacturonase isoenzymes. *J. Food Biochem.* 8(1); 1984; 39-54

SCARLET GOURD

- 2934 RAMACHANDRAN (K) and SUBRAMANIAN (B). Scarlet gourd *Coccinia grandis* little known tropical drug plant. *Econ. Bot.* 37(4); 1983; 380-83
C. grandis is widely distributed in plains of India. Its, botany distribution and uses have been given. The fruit is used as cooked vegetable, eaten raw, made into curries. The fruit is also stored as dehydrated chips in S. India. JVS

FRUITS

- 2935 HUGUET (C). Relations between fruit tree nutrition and physiological diseases or storage disorders. *Fruits.* 38(11);1983; 781-7 (French)
- 2936 MOKADY (S), COGAN (U) and LIEBERMAN (L). Stability of vitamin C in fruits and fruit blends. *J. Sci. Food Agric.* 35(4); 1984; 452 6
 During a 3-hour incubation, ascorbic acid level did not decrease in orange juice or model solution of analytical grade L-ascorbic acid. The levels of ascorbic acid decreased in apple, guava, and banana or in their blends. These decreases corresponded to the elevation in levels of dehydroascorbic acid. JVS
- 2937 CASIMIR (DJ). Countercurrent extraction of soluble solids from foods. *CSIRO Food Res. Q.* 43(2); 1983; 38-43
 The equipment description and the application of countercurrent extraction for grapes, fermented grape products, grape marc, apples and pears, citrus products and custacean residues have been covered. KAR

BANANA

- 2938 CHAKRABARTI (N) and NANDI (B). Post-infection changes of chitin in banana fruits. *Curr. Sci.* 53(5); 1984; 275-7
 The extent of fungal damage in banana fruits was studies by following the changes in chitin content. Two varieties of banana fruits were inoculated by *Botryotriplodia theobromae* Pat. and incubated for different periods and chitin was estimated method as chitosan. The final residue comprising of chitosan obtained during estimation was assayed based on its deamination to glucosamine using a set of external standard solution of glucosamine HCl in distilled water and expressing as μ g glucosamine. The amount of glucosamine obtained from chitin of the infected fruits was quantitatively estimated from the standards curve of the graded external glucosamine-HCl solution. Results showed that, following infection by the fungus, chitin increased considerably with storage time in both varieties showing their maximum after 6 days. MVG

CITRUS

- 2939 BLONDEL (L). Research on new citrus varieties for the French market. *Fruits* 38(11);1983; 789-94 (French)

- 2940 SHIMOKAWA (K). An. ethylene-forming enzyme in *Citrus unshiu* fruits. *Phytochemistry*. 22(9); 1983; 1903-1908
- 2941 RAGHAVENDRA RAO (NN). Effect of post-harvest fungicidal treatment of citrus fruits against the control of green mold rot. *J. Food Sci. Technol. (India)* 21(1); 1984; 25-8
- Coorg mandarin (*Citrus reticulata*) and seedless lime (*Citrus latifolia*) were treated separately for 5 minutes in 1000 ppm of Benlate, Bavistin, Thiabendazole, Imazilil SP and Imazilil EC. After 24 hours of treatment and subsequently at intervals of 7 days, fruits were artificially inoculated with *Penicillium digitatum*. All fungicides showed a gradual loss of protective ability to reduce decay with increase in time after decay. However, Imazilil SP and Imazilil EC were highly effective. Seedless lime fruits treated with Benlate, Bavistin and Thiabendazole gave a higher decay reduction index compared to Coorg mandarin when treated with the same fungicide. In contrast, Coorg mandarin fruits treated with Imazilil formulations showed higher decay reduction index than seedless lime treated with the same fungicide. KAR

MANGO

- 2942 KRISHNA MURTHY (GV), GIRIDHAR (N) and RAGHURAMAIAH (B). Suitability of some mango varieties for processing. *J. Food Sci. Technol. (India)* 21(1); 1984; 21-4
- 9 table varieties, 4 juicy varieties, and 5 hybrid mangoes of Andhra Pradesh (India) were evaluated for canning as slices, juice and nectar. 'Baneshan', 'Suvarnarekha' and '5/5 Rajapuri x Langra' variety were found suitable for canning as slices. 'Navaneetam', 'Baneshan', 'Goabunder', 'Royal special', 'Hydersaheb' and '9/4 Neelum Baneshan' varieties were found good for juice preparation, while 'Baneshan', 'Navaneetam', 'Goabunder', 'K. 0.7' and 'Sharbatga i' variety were good for nectar. The effect of addition of calcium chloride as firming agent on the quality of slices is described. AA

AVOCADO

- 2943 EAKS (IL). Effects of chilling on respiration and ethylene production of 'hass' avocado fruit at 20 C. *Hortscience*. 18(2); 1983; 235-7
- Fruit held for 2 weeks at 0 or 5 C displayed normal climacteric patterns and ethylene production at 20 C and developed no significant chilling injury symptoms. Exposures of 4 and 6 weeks at 0 or 5 C resulted in the development of chilling injury symptoms, abnormal ripening, atypical respiratory patterns and reduced ethylene production rates, which peaked after 2 days at 20 C and showed a declining rate thereafter with no increase in the rate of ethylene production associated with fruit softening. KAR

APPLE

- 2944 DOORES (S). The microbiology of apples and apple products. *CRC Crit. Rev. Food Sci. Nutr.* 19(2); 1983; 133-49

Discusses: ecology of apple microflora; mycotoxins; and production of quality apples and apple products. BSN

- 2945 MEHERIUK (M) and LANE (WD). A comparison of fruit from spur and standard 'McIntosh' at harvest and after controlled-atmosphere storage. *Hortsci-ence*. 18(2); 1983; 220-21

All spur strains were significantly softer than standard 'McIntosh' after 6 to 7 months of CA storage. No differences were found in acidity, but soluble solids after storage turned to be lower in the spur strains. KAR

DENNETTIA TRIPATELA

- 2946 UDOESSIEN (EI) and IFON (ET). Chemical studies on the unripe and ripe fruits of *Dennettia tripatela* (Pepper fruit). *Food Chem.* 13(4); 1984; 257-63

The paper reports on the proximate composition, as well as some mineral, vitamin and anti-nutritional constituents in the flesh and seeds of mature unripe and ripe fruits of *Dennettia tripatela*. KAR

SUGAR, STARCH AND CONFECTIONERY

- 2947 REVUZ (B). Proteins from carbohydrates: some perspectives? *Ind. Aliment. Agric.* 100(10); 1983; 697-701 (French)

Many plants of the single-cell protein industry have not yet been run on an economically profitable basis. The author tries to answer the question whether such a situation is likely to continue. He has examined the difficulties that have to be overcome for the industrial development of these most recent technologies, and their changes of success. KMD

SUGAR

- 2948 MANGAL SINGH. Research and development in sugar industry in India. *Indian Sugar*. 33(12); 1984; 793-804

The survey includes, the various developments in sugar process technology like cane preparation, reduction of sugar losses, boiled operation control, juice treatment, clarification processes, instrumentation towards improved process control, effluent control and waste utilisation. MVG

- 2949 SURI (SK), BHATT (S) and BOSE (S). Separation of glucose-fructose mixture by anion exchange resin chromatography. *Indian Sugar*. 33(12); 1984; 807-12

The chromatography of the mixture was carried out on 3 columns of bisulphite form of anion exchange resin IRA-400 (OH). Results show that the use of the resin in series and maintained at a temperature of 40 C gives four fractions, viz. (a) pure fructose (b) fructose rich glucose (c) glucose rich fructose, and (d) pure glucose. Recycling of the mixed fractions through the resin columns produced more fructose in pure form. MVG

- 2950 ROUSSEAU (G) and LANCRENON (X). A more rational approach to the introduction of ion-exchange techniques in the sugar factory. *Ind. Aliment. Agric.* 100(10); 1983; 703-7 (French)

Using the experience of the Eppeville Sugar Factory, which has established correlations between the colour of massecuites and sugar quality, the authors have explained how it is possible to plan the improvement of a traditional sugar factory diagram, in terms of sugar quality, extraction yield, and running cost, by employing ion-exchange technology. KMD

- 2951 LIPPOLD (G). Possibilities of the utilization of heat being developed in sugar refineries. *Lebensmittel-Industrie*. 30(4); 1983; 159-64 (German)

Sugar refineries are among the factories with very high consumption of fuels and production of heat. In the standardized technology, only 8% of the heat can be reused in the process itself, because of the low temperature level of about 60 C and other unfavourable circumstances. So Principal opportunities and problems of the utilization of the heat being developed in the sugar refinery and in other factories are discussed and explained by examples. AA

STARCH

- 2952 STUTE (Von R) and KONIECZNY-JANDA (G). DSC investigations of starches. Part II. Investigations on Starch-lipid-complexes. *Starch*. 35(10); 1983; 340-47 (German)

Starch-lipid-complexes are present in native starches, especially in cereal starches. Such complexes, as well as those formed with added emulsifiers, play an important role during utilization of starches and flours, e.g. in baking. Starch-lipid-complexes, or amylose-lipid-complexes, can be well characterized by Differential-Scanning-Calorimetry (DSC), while amylopectin-lipid-complexes could not yet be detected. The formation and the thermal stability of complexes with fatty acids depend on the chain length and the degree of unsaturation. The thermal stability increases with increasing chain length for saturated fatty acids and decreases with increasing degree of unsaturation for the unsaturated acids. Within a temperature range between 70-100 C a characteristic rearrangements can occur which are described in detail. AA

HONEY

- 2953 Di NAUTA (VS). Composition and commercial characteristics of the honey. *Ind. Aliment.* 22(9); 1983; 624-9 (Italian)

CHOCOLATE

- 2954 SCHREIBER (P). Truffle pralines. *Gordian*. 83(7-8); 1983; 152 (German)

The author tells us what truffle pralines are, and gives short recipes for the following item: cream truffles, butter truffles, rum truffles, brandy truffles, honey truffles, fruit truffles, and truffle chocolates. KMD

BAKERY PRODUCTS

- 2955 ANON. Symposium: "Standard Baking Tests around the World". *Getreide Mehl Brot*. 37(11); 1983; 339-51 (German)

Texts of the following 6 papers have been printed in this issue:
PRESTON (KR), KILBORN (RH) and TIPPLES (KH). Application of standard baking tests for the quality evaluation of Canadian wheats. (p. 339).
POMERANZ (Y). A single, universal bread baking test - why not? (p.341).
A FORD (DEW) . Test baking methodology in the U.K. (p. 343). UCHIDA (M). Test baking methods and their application in Japan. (p.345). KAISROVA (A) and HOLAS (J). Test baking methods in the CSSR. (p.347). SEIBEL (W), BRUMMER (J-M) and STEPHAN (H). Standard baking test for rye and rye-mixed bread. (p. 349). KMD

- 2956 MISKELLY (DM). Flour components affecting paste and noodle colour. *J. Sci. Food Agric.* 35(4); 1984; 463-71

Several factors are known to interact to affect the colour of flour and its products. The colour was investigated in this study in terms of brightness and yellowness. Differences in these criteria could be traced to the cultivar, extraction rate, protein content starch damage and certain pigments. JVS

DOUGH

- 2957 ENDO (S), TANAKA (K) and NAGAO (S). Do-corder studies on dough development. I. Interactions of water absorption, sulphydryl level, and free lipid content in heated dough. *Cereal Chem.* 61(2); 1984; 112-6

BREAD

- 2958 ANON. Symposium: "Functional properties of different dietary fibres". *Getreide Mehl Brot*. 37(12); 1983; 377-83 (German)

The following papers have been printed in this issue: SEIBEL (W) - Enrichment of bread and small baked goods with different dietary fibres. (p.377-9). MEUSER (F), SUCKOW (P) and KULIKOWSKI (W) - Analytical determination of dietary fibres in bread, fruit, and vegetables. (p.380-83). KMD

- 2959 RAJAPAKSA (D), ELIASSON (A-C) and LARSSON (K). Bread baked from wheat/rice mixed flours using liquid-crystalline lipid phases in order to improve bread volume. *J. Cereal Sci.* 1(1); 1983; 53-61

Earlier studies on the effect of polar lipids in bread-making showed that the lamellar liquid-crystalline phase of lipids is most effective in increasing bread volume. Bread, with about the same volume as the corresponding wheat bread, can be made from a 1:1 wheat/rice mixed flour, if 2% (w/w) of lipids are added in the form of a liposomal dispersion. Various phospholipid preparations were tested and even the crude lecithin, obtained in the refining of rapeseed oil was effective. Lipid vesicles, prepared by ultrasonication, were superior to liposomes in increasing bread volume. Pasting temperature and peak temperature (Brabender amylograph) were the same for the 1:1 mixture of rice and wheat flours as for

the rice flour, whereas the viscosity was almost as low as for the wheat flour. Differential scanning calorimetry transition temperatures and enthalpies for the mixed dough were very similar to the values obtained for the wheat dough, whereas the values for the rice dough were higher. The use of a dispersed lipid phase to increase bread volume was also demonstrated by producing an acceptable bread from a 1:1 sorghum/wheat flour mixture with added lecithin. AA

- 2960 GUY (EJ). Evaluation of the bread-baking quality and storage stability of 12% soy-fortified wheat flour containing sweet cheese whey solids. *Cereal Chem.* 61(2); 1984; 83-8
- Substitution of 1-3% commercial pasteurized grade A sweet whey solids (SWS) for wheat flour in a 12% soy-fortified bread flour mix containing sodium stearyl-2-lactylate (SSL), increased bread volumes by 5-10% and decreased crumb compressibility during storage. Substitution of SWS lowered dough absorption by an amount equal to the added solids and progressively darkened crust colour, making substitution beyond 2-3% impractical. High-heat skim milk solids or high-heat SWS substituted for wheat flour did not change loaf volumes, but α -lactose hydrate also increased loaf volumes. Soy-fortified bread wheat flour mixes containing 2% SWS and 0.5% SSL stored satisfactorily up to six months at 20-25 C and produced breads of higher volume than did their respective controls without SWS. The baking quality of both the control and the mix containing SWS stored at 36 C deteriorated extensively after two weeks. However, the addition of 3% shortening or 0.5% SSL to these mixes at the time of baking restored their volume losses. Added SWS caused no change of quality in taste or texture in the breads made from stored mixes. AA
- 2961 SHOGREN (MD) and FINNEY (KF). Reproducibility of 100-gram bread volume as affected by correct-side, wrong-side, or both-sides break and shred. *Cereal Chem.* 61(2); 1984; 179-81
- Laboratory bread loaves (100 g) having correct-side, wrong-side, and both-sides break and shred had average loaf volumes of 980, 994 and 962 cc and standard deviations of 12.4, 21.5, and 15.2 cc, respectively. Occurrence of correct-side breaks was enhanced (up to 100%) with proper greasing of unglazed bread pans. AA
- 2962 FARIDI (HA) and RUBENTHALER (GL). Effect of baking time and temperature on bread quality, starch gelatinization, and staling of Egyptian balady bread. *Cereal Chem.* 61(2); 1984; 151-4
- Balady bread was prepared by oven baking at four levels of time and temperature (540 C, 1 minute; 415 C, 2 minutes; 370 C, 3-4 minutes; 260 C, 6-7 minutes). Drier breads of low quality resulted from lower oven temperature and longer baking time. Starch gelatinization to maximum extent was observed in breads baked at medium temperature. Breads baked at 260 C for 6-7 minutes showed faster staling rate as measured by loss of crumb soluble starch and its amylose content, pasting properties and alkaline water-retention capacity, as compared to short time, high temperature baked breads. During first 8 hours of storage, staling rate was very fast. BSN
- 2963 EL-SAMAHY (SK) and TSEN (CC). Changes of temperature inside the loaves of Balady and pan breads during baking. *Chem. Mikrobiol. Technol. Lebensmittel.* 8(1); 1983; 15-8

At the start of the baking process of Balady bread, the internal temperature of the dough increased linearly with time. It reach the maximum value of 210 F after being baked for 1.5 minutes at 650 F. fh-values of 11.1, 14.5, 15.3, and 18.6 were obtained when the bread was baked at 650, 600, 550, and 450 F respectively. Increasing the weight of dough (125 to 225) in the loaf, did not have any clear effect on the penetration of heat. Starch granules inside the bottom crust of Balady bread suffered a great loss of birefringence. The fh-values of pan-baked bread were 43.4, 65.6, and 84.7 when the baking temperatures were 475, 425, and 375 F respectively. The profile of heat penetration during baking is not similar at different locations inside the pan-baked loaf. Further research is needed on the survival of micro-organisms, especially in Balady bread. KMD

- 2964 POMERANZ (Y), SEIBEL (W), BRUMMER (J-M) and STEPHAN (H). Technological effects produced by oils and fats, in the presence of emulsifiers, on the baking of yeast-raised products. *Getreide Mehl Brot*. 37(12); 1983; 372-6 (German)

Yeast-raised baked goods - e.g. wheat bread - were produced with 0.3% (active ingredient) of a DAWE-ester, lecithin, or mono-/di-glycerides; these agents were used either alone, or in combination with 1,3,5,10 or 15% of groundnut oil, or groundnut fat. No clear difference was noted among the different oils (groundnut, soy, rape) in respect of volume increase and other bread properties. When emulsifiers were not used, a greater volume yield was obtained with groundnut fat than with groundnut oil. A good wheat bread - in terms of volume yield, pore formation, crumb elasticity, and fresh-keeping quality - can be obtained with 2% groundnut oil and 0.3% emulsifier; it is comparable to a bread made with 5% groundnut fat by the conventional method. This quality standard is achieved more easily with DAWE than with lecithin or mono-/di-glycerides. Certain emulsifiers produce a very large volume increase, but at the cost of crumb elasticity. KMD

- 2965 KLEMPF (J). Production of sour-dough bread by direct development. *Gortdian*. 83(7-8); 1983; 142-3 (German)

The older process of bread-making using sour dough has been compared with the modified process using freeze-dried sour dough. KMD

- 2966 POMERANZ (Y), EL-BAYA (AW), SEIBEL (W) and STEPHAN (H). Toast bread from defatted wheat flour. *Cereal Chem*. 61(2); 1984; 136-40

BISCUIT

- 2967 BURT (DJ) and FEARN (T). A quantitative study of biscuit microstructure. *Starch*. 35(10); 1983; 351-4

A simple stereological analysis system was constructed in order to obtain quantitative information on the distribution of the major constituents of a biscuit at different locations within the structure. The biscuits studied were of the semi-sweet type which were baked using mainly radiant heat and were then humidified, fixed, embedded and sectioned for microscopical examination. The constituents studied (protein, fat, native starch, gelatinized starch and space) were identified by staining and polarized light techniques. Variations of some of the constituents are probably due to the pattern of heat penetration and moisture loss. AA

CAKE

- 2968 MAR (A). Industrial production of "Sacher" cakes. *Getreide Mehl Brot*. 37(11); 1983; 335-9 (German)

According to Austrian specifications, "Sacher" cakes - first made by Franz Sacher in 1832 - must be made only with butter (no other fat is permitted) and must contain at least 15% of chocolate. The use of emulsifiers and baking powder is not permitted. Hence, industrial manufacture of "Sacher" cakes by the All-in process becomes an impossibility, except for export. Moreover, "Sacher" cakes must have a filling of marillen marmalade only, and should be coated with a chocolate glazing, or chocolate fondant, or a dipping mass. An industrially feasible "All-in" process has been worked out, on the basis of this classical recipe. But such a modified product may be sold in Austria only under the name "chocolate-butter cake" and not as "Sacher" cake. KMD

- 2969 DONELSON (JR), YAMAZAKI (WT) and KISSELL (LT). Functionality in white layer cake of lipids from untreated and chlorinated patent flours. II. Flour fraction interchange studies. *Cereal Chem.* 61(2); 1984; 88-91

MILK AND DAIRY PRODUCTS

- 2970 GAIL (C). Cost/benefit analysis of food quality control. *Dairy Food Sanitation*. 3(10); 1983; 364-71

Discusses: design of quality control processes; interactions and costs and benefits; applications of cost benefit assessment in quality control procedures (chemical analyses and value of precision and accuracy). BSN

- 2971 KIESEKER (FG). Recombined dairy products. *CSIRO Food Res. Q.* 43(2); 1983; 25-37

Raw materials needed for preparing recombined products; and the range of dairy products that could be prepared by recombination have been covered. KAR

MILK

- 2972 MUNRO (GL), GRIEVE (PA) and KITCHEN (BJ). Effects of mastitis on milk yield, milk composition, processing properties and yield and quality of milk products. *Aust. J. Dairy Technol.* 39(1); 1984; 7-16

Effects of mastitis on milk yield and milk composition including, total solids, fat content, and composition, total protein, total casein, and α -, β -, κ , and γ -casein, lactoglobulin, and on properties of milk and quality of milk, have been covered. KAR

- 2973 DAEMEN (ALH), KRUK (A) and VAN DER STEGE (HJ). The destruction of enzymes and bacteria during the spray-drying of milk and whey. 3. Analysis of the drying process according to the stages in which the destruction occurs. *Neth. Milk Dairy J.* 37(4); 1983; 213-28

Sampling of the concentrated milk or milk powder at different stages of the drying process was carried out by a special technique with liquid

nitrogen. In particular, the influence of the outlet air temperature and the initial total solids content were studied. The influence of the outlet air temperature appeared to be connected with the stage at which the inactivation occurred. The influence increased accordingly as the inactivation occurred at a later stage of the second part of the drying process. KAR

- 2974 ZADOW (JG) and HARDHAM (JF). The effect of single or triple piston homogenization on the fat globule distribution of milk. *Aust. J. Dairy Technol.* 39(1); 1984; 36-40

Homogenization having the triple piston homogenizer at a given pressure resulted in lower average fat globule size than that did triple piston homogenization at 60 C as compared at 30 C. Mathematical analysis of the homogenizer flows indicated that more than 86% of the milk passed through the single piston homogenizer valve system at a greater rate than the maximum flow through the triple piston homogenizer valve system. KAR

- 2975 NAKAI (S). Derancidification of milk by adsorption. *J. Dairy Sci.* 66(9); 1983; 1815-21

- 2976 HURST (WJ), ALEO (MD) and MARTIN (RA) Jr. High performance liquid chromatographic analysis of cholesterol in milk. *J. Dairy Sci.* 66(10); 1983; 2192-4

The HPLC technique employing a non-aqueous reversed phase system for analysis of cholesterol in whole milk powder and commercial milk products involves preparation of sample by saponification with methanolic potassium hydroxide followed by extraction with ether, removal of potential interfering substances prior to injection by a simple clean up procedure using a silica gel sep-pakTM. The chromatographic system used included a carbon-18 column with a hexane/isopropanol mobile phase and detection at 205 nm. Method validation and recovery studies using carbon-14 labeled cholesterol showed excellent performance. BSN

- 2977 FURTADO (MM). Detection of cow milk in goat milk by polyacrylamide gel electrophoresis. *J. Dairy Sci.* 66(9); 1983; 1822-4

Pasteurized goat milk was adulterated with increasing proportions of cow milk and submitted to polyacrylamide gel electrophoresis. A frontal band, missing from the pattern of genuine goat milk and possessing the same electrophoretic mobility as bovine α_{S1} -casein, was expressed. The area of this zone was directly proportional to the amount of cow milk added to the goat milk. AA

- 2978 HANKIN (L) and SHIELDS (D).. Keeping quality and flavour, and microorganisms, proteases and lipases in raw cow and goat milk at collection and after storage. *J. Food Prot.* 46(10); 1983; 873-7

- 2979 MOCHRIE (RD) and DICKEY (DA). Comparison of semi-automated method with official optical somatic cell counting method. III for determining somatic cells in milk. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 615-7

The present method with Fossomatic-90 includes a halogen lamp, a semiconductor photoelectric detector, a bench-top cabinet, manual injection of a larger sample and a reduced capacity. By using this new machine cell counts were 8.5% higher in original machines, and 2.9% lower than direct microscopic somatic cell count. JVS

- 2980 CHEUNG (BA) and WESTHOFF (DC). Isolation and identification of ropy bacteria in raw milk. *J. Dairy Sci.* 66(9); 1983; 1825-34

- 2981 HIRSH (DC) and MARTIN (LD). Detection of *Salmonella* spp. in milk by using Felix-01 bacteriophage and high-pressure liquid chromatography. *Appl. Environ. Microbiol.* 46(5); 1983; 1243-5

A method is described whereby the presence of less than five salmonellae was detected per milliliter of milk within 24 hour of sample collection. Salmonellae were removed from milk by means of electropositive large-pore filters. Eluates from the filters were analyzed for the presence of *Salmonella* spp. by Felix-01 bacteriophage and high-pressure liquid chromatographic techniques. The method gave only a positive response when salmonellae were present in the milk. Of the serotypes and strains of *Salmonella* spp. tested, *Salmonella dublin* (10 strains), *Salmonella typhimurium* (5 strains), *Salmonella anatum*, *Salmonella krefeld*, and *Salmonella saint-paul* gave positive responses. One strain of *Salmonella agona* (three strains tested) and three strains of *Salmonella enteritidis* (seven strains tested) were not detectable by the method described herein. AA

- 2982 ROGINSKI (H), BROOME (MC) and HICKEY (MW). Non-phage inhibition of group N streptococci in milk. 1. The incidence of inhibition in bulk milk. *Aust. J. Dairy Technol.* 39(1); 1984; 23-7

Non-phage inhibition could not be related to the thiocyanate and iodine levels, the composition of cow diet, the presence of antibiotic residues or to the area of milk collection. Also inhibition could not be attributed to the concentration of lysozyme above that the likely to be found in milk. Starter inhibition was both variable and strain dependent. KAR

- 2983 ROGINSKI (H), BROOME (MC), HUNGERFORD (D) and HICKEY (MW). Non-phage inhibition of group N streptococci in milk. 2. The effects of some inhibitory compounds. *Aust. J. Dairy Technol.* 39(1); 1984; 28-32

In the concentrations likely to be present in milk, the xanthine oxidase-hypoxanthine (XOD-HX) system generated physiologically significant amounts of H_2O_2 . Generation of H_2O_2 by starter organisms themselves depended on NADH oxidase:NADH peroxidase ratios in the organisms and availability of molecular oxygen in the medium. Some starter organisms were stimulated by unoxidized thiocyanate. The growth and acid production by *Streptococcus cremoris* C1 were stimulated by the completed lactoperoxidase-hydrogen peroxide-thiocyanate system (LPS) in milk, probably through removal of H_2O_2 as this organism was inhibited by the direct action of H_2O_2 . Inhibition of starter organisms by quaternary ammonium compound (QAC) was strain-dependent and significant QAC-related inhibition only occurred at high levels of QAC. The inhibitory effect of LPS and QAC on the activity of lactic streptococci was additive. AA

- 2984 RADEWONUK (ER), STROLLE (EO) and CRAIG (JC) Jr. Freezing points of skim milk concentrates. *J. Dairy Sci.* 66(10); 1983; 2061-9

For determining freezing points of a series of concentrates prepared from skim milk, three methods - reconstitution of powder, evaporation of fresh milk and concentration of fresh milk by reverse osmosis were employed. In order to monitor concentration, refractive index data were developed. By means of empirical equations, freezing point data have been explained. Statistical analysis showed the correlation for the reconstituted milk to be different from the other two products. Cooling did not affect freezing point depression over the range 0.5 to 3.3 C/minutes. BSN

- 2985 KOCAK (HR), ZADOW (JG) and PURCELL (J). Short term changes in the ionic calcium content of heat-treated skim milk. *Aust. J. Dairy Technol.* 39(1); 1984; 40-43

Skim milks were subjected to heat treatments of 55 C for 60 minutes, 63 C for 30 minutes, 72 C for 15 seconds, 85 C for 15 seconds or 85 C for 30 minutes. The percentage reduction in the ionic calcium content of milks did not vary widely as a function of the particular heat treatment. The rate of increase of ionic calcium content during storage at 20 C was slower in samples subjected to more severe heat treatment. KAR

- 2986 BICAN (P). High performance liquid chromatography of casein peptides. *J. Dairy Sci.* 66(10); 1983; 2195-7

MILK SWEETS

- 2987 VARADARAJ (MC) and RANGANATHAN (B). Effect of Chhana and rasagolla preparations on preformed staphylococcal enterotoxins and thermostable deoxyribonuclease in milk. *J. Food Sci. Technol.* (India) 21(1); 1984; 28-31

Raw cow's milk inoculated with enterotoxigenic strains of *Staphylococcus aureus* at levels of 1×10^6 CFU/ml of milk were incubated at 37 C for 10-12 hours. Incubated milk samples showed staphylococcal populations of 10^8 - 10^9 CFU/ml, thermostable deoxyribonuclease (TDNase) levels of 10-14 mm zone diameter and detectable levels of enterotoxin. Conversion of the incubated milk samples initially into Chhana and subsequently to rasogolla showed the absence of Staphylococci, but presence of TDNase and enterotoxins. When Chhana and rasogolla were enriched in 3.7% brain heart infusion broth for 20 hours at 37 C, staphylococci (10^4 - 10^9 CFU/ml) reappeared and an increase in TDNase was observed. KAR

BUTTER MILK

- 2988 KARUNAKAR (S), RAO (BVR) and RAO (TJ). The preservative effect of solid carbon dioxide and carbon dioxide gas on quality of salted and sweetened butter milk. *J. Food Sci. Technol.* (India) 21(1); 1984; 46-8

Butter milk was prepared by adding 10% sugar and 1% salt in separate batches and preserved at refrigeration (5-8 C) temperature for 11 days after addition of (i) solid CO₂ or (ii) bubbling CO₂. Titratable acidity (as % lactic acid) was 0.777 in (i) and 0.773 in (ii) compared to 0.765 in control with salted butter milk and the corresponding values in sweetened butter milk were 0.754, 0.750 and 0.735. Wheying off was found to be minimum in sweetened butter milk of (i). (i) was found to be more suitable for preserving salted butter milk, where as (ii) was best suited for sweetened butter milk in maintaining organoleptic quality for 11 days. KAR

YOGHURT

- 2989 GOPALA KRISHNA (G), RAO (BVR) and RAO (TJ). Yoghurt from whey based reconstituted milk. *J. Food Sci. Technol.* (India) 21(1); 1984; 48-9

Yoghurt was prepared from (i) cream diluted with 85% fluid cheddar cheese whey (total solids 16.5%); (ii) milk reconstituted by adding water (SNF 13.5%), and (iii) cow milk standardized by adding non-fat dry milk

(SNF 13.5%). Samples were tested for titratable acidity, pH, protein and lactose during processing and on alternate days of 7 days storage period. pH did not vary much, but protein content increased and lactose content decreased during storage. (i) was rated excellent in flavour, body, and texture and was well accepted by the panel. KAR

BUTTER

- 2990 WOO (AH) and LINDSAY (RC). Stepwise discriminant analysis of free fatty acid profiles for identifying sources of lipolytic enzymes in rancid butter. *J. Dairy Sci.* 66(10); 1983; 2070-75

For characterization of lipolytic enzymes in experimental and commercial rancid butters, the stepwise discriminant analysis techniques described when applied to quantitative data for individual free fatty acids were found useful. For categorization of enzyme types, specificities of lipases and esterases for major fatty acids could be used. Separator slime lipolytic enzymes were found to be heterogenous. BSN

CHEESE

- 2991 NELSON (JH). Should cheese be refrigerated. *Dairy Food Sanitation.* 3(10); 1983; 372-5

Discusses: general principles; reasons for out-of-refrigeration display; technology of natural cheeses; process cheese and related products; concerning mold on cheese; and definition of 'potentially hazardous food;'. BSN

- 2992 NOOMEN (A). The role of the surface flora in the softening of cheeses with a low initial pH. *Neth. Milk Dairy J.* 37(4); 1983; 229-32

In this review, consideration is given to migration of proteolytic enzymes into cheese and influence of pH and protein degradation on changes in consistency. KAR

- 2993 HISADA (K), TERADA (H), YAMAMATO (K), TSUBOUCHI (H) and SAKABE (Y). Reverse phase liquid chromatographic determination and confirmation of aflatoxin M₁ in cheese. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 601-6

Cheese is extracted with chloroform, cleaned-up on 2 silica gel columns followed by Sep-Pak C₁₈ cartridge, and passed through a 5 µm octadecyl silica gel column with fluorometric detection. Analysis by liquid chromatography with trifluoroacetic acid treatment of extract yields quantitative data. JVS

- 2994 WISEMAN (DW) and MARTH (EH). Behaviour of aflatoxin M₁ during manufacture and storage of Queso Blanco and bakers' cheese. *J. Food Prot.* 46(10); 1983; 910-13

ICE CREAM

- 2995 MINHAS (KS) and BAINS (GS). Comparative study of plant gums, gelatin and sodium alginate as stabilizers in buffalo milk ice cream mixes. *J. Food Sci. Technol. (India)* 21(1); 1984; 32-5

Suitability of different stabilizers (gums) in the preparation of ice

cream mix from buffalo milk was studied. The gums added (g/100 g mix) were: Acacia, 0.25-0.75, Dhak (*Butea monosperma*) 0.25-0.75, karaya (*Sterculia ureus*) 0.10 to 0.30, Guar 0.05-0.10, sodium alginate 0.20-0.40 and gelatin 0.15-0.45. The optimum levels consistent with ice cream quality and organoleptic score were guar 0.05; acacia 0.50%, karaya 0.10%, dhak 0.25%, gelatin 0.45% and sodium alginate 0.30%. The body, texture and flavour of ice cream were highly interrelated. Ice cream prepared from optimum levels of stabilizers were stored for 35 days when gelatin and gum acacia showed better stabilizing effect on the body and texture of ice cream, but dhak, gum, sodium alginate, and guar gum showed deterioration in texture and flavour.

KAR

MEAT AND POULTRY

- 2996 ROBSON (RM), O'SHEA (JM), HARTZER (MK), RATHBUN (WE), LASALLE (F), SCHREINER (PJ), KASANG (LE), STROMER (MH), LUSBY (ML), RIDPATH (JF), PANG (Y-Y), EVANS (RR), ZEECE (MG), PARRISH (FC) and HUIATT (TW). Role of new cytoskeletal elements in maintenance of muscle integrity. *J. Food Biochem.* 8(1); 1984; 1-24

- 2997 GOPAL RAO (KR), VIJAYA RAO (D), BHAGIRATHI (B), D'SOUZA (J) and SHARMA (TR). Factors influencing survival of *Staphylococcus aureus* during freeze-drying. *Chem. Mikrobiol. Technol. Lebensmittel.* 8(1); 1983; 1-6

Microbial levels were monitored during the preparation of freeze-dried mince meat. The effects of the following variables were studied: freezing, carrier medium, vacuum, drying temperature, exposed surface area, and inherent differences due to the strain on the survival of *Staphylococcus aureus*. In the freeze-dried product, total plate counts lay between 10^3 and 10^5 /g, coliforms were <100 - 10^4 /g, and staphylococci between 0 and 10^2 /g. Freezing at -30 C consistently destroyed more gram-negative bacteria (70-98%) than staphylococci (8-98%). KMD

- 2998 KOIDIS (P) and DOYLE (MP). Survival of *Campylobacter jejuni* in fresh and heated red meat. *J. Food Prot.* 46(9); 1983; 771-4

- 2999 FIDDLER (W), DOERR (RC), GATES (RA) and FOX (JB) Jr. Comparison of chemiluminescent and AOAC methods for determining nitrite in commercial cured meat products. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 525-8

The accuracy of a nitric oxide-ozone chemiluminescent detector (CLD) for determining nitrite in a variety of comminuted/noncomminuted commercial cured meat products (by comparison with AOAC method 24.041) was determined. The CLD gave higher NaNO_2 results than AOAC-sulfanilamide/N-(1-naphthyl) ethylenediamine reagent combinations. JVS

- 3000 SMITH (DR). Restructured meat products. A review. *Food Technol. Aust.* 36(4) 1984; 178-83

The review covers aspects like market opportunities, factors affecting restructured meat products, commercial products and processes and research aspects. KAR

BEEF

- 3001 KEMPSTER (AJ) and COOK (GL). Variation among beef breeds in carcass retail value at constant carcass saleable meat content and percentage of higher priced cuts. *Meat Sci.* 9(4); 1983; 281-90
- 3002 KRISHNAN (KR). A note on processing weasands from male buffalo calves. *J. Food Sci. Technol.* (India) 21(1); 1984; 49-50
 The esophagus from 20 slaughtered Murrah male buffalo calves of different body weight (10 calves of weight 139.7 ± 2.28 kg and other 10 are 183 ± 2.65 kg) were collected and processed into weasands; these were obtained when submucosa and mucus membrane of muscular part of the esophagus were carefully severed and dried and their quality was assessed. Weasands obtained from 139.7 ± 2.28 kg slaughtered weight group were of Grade III quality, while those from 183.7 ± 2.65 kg could be grouped into Grade I (20%), Grade II (50%), and Grade III (50%) which is based on the length of the weasands. The entire tunica mucosa, and part of tunica sub mucosa of the esophagus formed the weasand. KAR
- 3003 RHEE (KS) and SMITH (GC). A further study of effects of glandless cottonseed flour on lipid oxidation and colour changes in raw ground beef containing salt. *J. Food Prot.* 46(9); 1983; 787-90
- 3004 GREER (GG), JEREMIAH (LE) and WEISS (GM). Effects of wholesale and retail contamination on the case life of beef. *J. Food Prot.* 46(10); 1983; 842-5
- 3005 NIEMAND (JG), VAN DER LINDE (HJ) and HOLZAPFEL (WH). Shelf-life extension of minced beef through combined treatments involving redurization. *J. Food Prot.* 46(9); 1983; 791-6
- 3006 KOOHMARAIE (M), KENNICK (WH), ELGASIM (EA), DICKSON (RL) and SANDINE (WE). Storage and display-life characteristics of beef as affected by prerigor pressurization. *J. Food Prot.* 46(10); 1983; 878-82
- 3007 WHITE (CA) and HALL (LP). The effect of temperature abuse on *Staphylococcus aureus* and salmonellae in raw beef and chicken substrates during frozen storage. *Food Microbiol.* 1(1); 1984; 29-38
 Raw beef and chicken substrates inoculated with *Staphylococcus aureus* and two serotypes of *Salmonella* were subjected to severe temperature abuse at intervals during 6 months frozen storage at -18 C. After 24 hr, *S. hadar* in chicken at 20 or 27 C increased by 2.87 and 5.40 log cycles, respectively. In beef, *S. typhimurium* increased by 1.80 and 2.93 log cycles. Refreezing thawed samples reduced the Salmonellae by up to 99%. KAR
- 3008 VANDERZANT (C), CHESSER (LK), SAVELL (JW), GARDNER (FA) and SMITH (GC). Effect of addition of glucose, citrate and citrate-lactic acid on microbiological and sensory characteristics of steaks from normal and dark, firm and dry beef carcasses displayed in polyvinyl chloride film and in vacuum packages. *J. Food Prot.* 46(9); 1983; 775-80
- 3009 TOMIOKA (Y), YASUDA (M), TSUCHIYA (E) and YOKOYAMA (M). Shelf-life of beef steaks packaged with gases in consumer packs. Studies on keeping quality of beef by the use of modified gas atmospheres. Part I. *J. Jpn. Soc. Food Sci. Technol.* 30(1); 1983; 25-32 (Japanese)

In order to estimate the effect of gas atmosphere on the shelf-life of beef, as the first step, beef steaks were packaged in deep draw tray systems which were injected with O_2 , CO_2 and their mixtures: (a) $O_2 = 3$, (b) $O_2/CO_2 = 2/1$, (c) $O_2/CO_2 = 1/2$, (d) $CO_2 = 3$. For these steaks, sensory evaluations, analyses of metmyoglobin, bacterial counts, pH, and volatile basic nitrogen were carried out. The sensory evaluation for colour indicates that the higher the concentration of O_2 , the brighter the redness of meat colour. But, as for steaks stored in $O_2 = 3$, the surface discolouration was faster than the ones in the other atmospheres, and the significantly higher bacterial counts might be responsible for this discolouration. In the high CO_2 -containing atmospheres, though the steaks had slightly acidic odour at first (2 day), they were comparatively of good quality in the final stage. The bacteriostatic effect of CO_2 was similarly recognized between 33~100%. The steaks showed the longest shelf-life as a consumer-pack, when they were stored in $O_2/CO_2 = 2/1$ gas atmosphere. AA

BOVINE

- 3010 ZIEGLER (GR) and ACTON (JC). Heat-induced transitions in the protein-protein interaction of bovine natural actomyosin. *J. Food Biochem.* 8(1); 1984; 25-38
- 3011 FRANK (R), BRAUN (HE) and FLEMING (G). Organochlorine and organophosphorus residues in fat of bovine and porcine carcasses marketed in Ontario, Canada from 1969 to 1981. *J. Food Prot.* 46(10); 1983; 893-900

HAMBURGER

- 3012 TUCKER (DJ) and JONES (GP). The effect of heat processing on hamburger proteins and some observations on analytical problems arising. *Food Technol. Aust.* 35(12); 1983; 572-3

SHEEP

- 3013 PETERSEN (GV). The effect of swimming lambs and subsequent resting periods on the ultimate pH of meat. *Meat Sci.* 9(4); 1983; 237-46
- 3014 DEVINE (CE), GILBERT (KV) and ELLERY (S). Electrical stunning of lambs. The effect of stunning parameters and drugs affecting blood flow and behaviour on petechial haemorrhage incidence. *Meat Sci.* 9(4); 1983; 247-56

GOAT

- 3015 NUNEZ GONZALEZ (FA), OWEN (JE) and ARIAS CERECERES (MT). Studies on the Criollo goat of Northern Mexico. Part 2. Physical and chemical characteristics of the musculature. *Meat Sci.* 9(4); 1983; 305-14

PORK

- 3016 BAKANOWSKI (SM) and ZOLLER (JM). Endpoint temperature distributions in microwave and conventionally cooked pork. *Food Technol.* 38(2); 1984; 45-51
Microwave cooking consists of a source of energy (megatron) coupled to the food by radiation. The microwaves transfer their energy to food as source of heat. In this study, retail cuts of pork roasts and chops have been cooked in a microwave oven. Infrared thermography has been used to observe heating patterns of cooked foods. Thermographs of typical pork roasts cooked conventionally and by microwave are provided. The cooking time for conventionally prepared roasts was 2-2½ longer than microwave roasts. A stand time of 20 minutes after completion of cooking, was necessary to allow thermal diffusion for smoothening temperature distribution. The thermographs of such roasts had identically appearance to and could not be distinguished from those of conventionally cooked roasts. JVS
- 3017 BIJKER (PGH), KOOLMEES (PA) and van LOGTESTIJN (JG). Tissue composition of mechanically deboned pork (MDP). *Meat Sci.* 9(4); 1983; 257-69
- 3018 WARRISS (PD), KESTIN (SC) and ROBINSON (JM). A note on the influence of rearing environment on meat quality in pigs. *Meat Sci.* 9(4); 1983; 271-9
- 3019 DI ANTONIO (E), AVELLINI (P), VIZZANI (A), SEVERINI (M) and DOMINICI (S). Researches on the presence of milk powder in Italian suasages labelled as made of pure pork. *Ind. Aliment.* 22(9); 1983; 630-35 (Italian)
Attempts were made to detect the presence of beef in Italian sausages that were declared as being made of pure pork and skim milk powder. Various analytical techniques were tested. It was found that bi-dimensional gel diffusion does not help much in the detection of such an adulteration, while the radial gel diffusion does enable one to estimate the content of beef as well as of milk powder. A gas chromatographic technique also succeeded in giving an estimate of the milk powder content. A combination of analytical techniques, and an appropriate calculation procedure have been suggested. KMD
- 3020 BLICKSTAD (E) and MOLIN (G). Carbon dioxide as a controller of the spoilage flora of pork, with special reference to temperature and sodium chloride. *J. Food Prot.* 46(9); 1983; 756-63, 766

HAM

- 3021 HUHTANEN (CN), FEINBERG (JI), TRENCHARD (H) and PHILLIPS (JG). Acid enhancement of *Clostridium botulinum* inhibition in ham and bacon prepared with potassium sorbate and sorbic acid. *J. Food Prot.* 46(9); 1983; 807-10

BACON

- 3022 FIDDLER (W), PENSABENE (JW), GATES (RA) and PHILLIPS (JG). Dry column-thermal energy analyser method for determining N-nitrosopyrrolidine in fried bacon: Collaborative study. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 521-25
The volatile nitrosamines in fried, cure-pumped bacon are currently isolated and detected by using the mineral oil distillation thermal energy analyser. This method is lengthy and also exhibits the potential for arti-

factual nitrosamine formation. An improved dry column method which was rapid and did not involve the distillation step was developed and collaboratively tested for isolating N-nitrosopyrrolidine (NPYR) from fried, cure-pumped bacon; the detection of the NPYR was by GC-thermal energy transfer. JVS

POULTRY MEAT

- 3023 POONI (GS) and MEAD (GC). Prospective use of temperature function integration for predicting the shelf-life of non-frozen poultry-meat products. *Food Microbiol.* 1(1); 1984; 67-78

The review covers aspects like criteria used to determine spoilage, predictive equations, application of models to poultry spoilage data; effect of temperature on the spoilage microflora; and prospects for commercial application. KAR

CHICKEN

- 3024 NELSON (KA), BUSTA (FF), SOFAS (JN) and WAGNER (MK). Effect of polyphosphates in combination with nitrite-sorbate or sorbate on *Clostridium botulinum* growth and toxin production in chicken frankfurter emulsions. *J. Food Prot.* 46(10); 1983; 846-50, 855

BROILER

- 3025 LILLARD (HS) and THOMSON (JE). Comparison of sampling methods for *Escherichia coli* and total aerobic counts of broiler carcasses. *J. Food Prot.* 46(9); 1983; 781-2

Significantly higher *Escherichia coli* and total aerobic counts were obtained from broiler carcasses when 20 g of excised breast skin were blended in peptone solution, than when either whole carcasses or 20 g of excised breast skin were rinsed in peptone solution for sampling. AA

TURKEY

- 3026 YUSUFU (HI), GENIGEORGIS (C), FARVER (TB) and WEMPE (JM). Prevalence of *Campylobacter jejuni* at different sampling sites in two California turkey processing plants. *J. Food Prot.* 46(10); 1983; 868-72

EGG

- 3027 KRISHNAPPA (P) and RAMACHANDRA REDDY. Nutritive value of egg. *Poult. Guid.* 21(3); 1984; 65-70

The authors have given fairly detailed comparisons of the nutritive value of eggs, milk, and meat, of farm (or hybrid) and desi (i.e. indigenous Indian) eggs, and of raw and cooked eggs. They have also dealt with the concept of "vegetarian" eggs, and explained the causes of several so-called "defects" which do not really have any adverse effect on the nutritive value of eggs. KMD

SAUSAGE

- 3028 SIMONETTI (P), CANTONI (C), FRIGERIO (R) and PROVERA (D). Starters and ripening of Italian dry sausages. *Ind. Aliment.* 22(9); 1983; 614-7 (Italian)

A species of *Micrococcus* spp, isolated from dry sausages, has been found to improve the organoleptic qualities of Italian dry sausages better than commercial origin starters. AA

SEAFOODS

- 3029 ABEYTA (C) Jr. Bacteriological quality of fresh seafood products from Seattle retail markets. *J. Food Prot.* 46(10); 1983; 901-9

- 3030 ENTIS (P) and BOLESZCZUK (P). Overnight enumeration of *Vibrio parahaemolyticus* in seafood by hydrophobic grid membrane filtration. *J. Food Prot.* 46(9); 1983; 783-6

A method was developed for direct enumeration of *Vibrio parahaemolyticus* in foods by hydrophobic grid membrane filter. The method consisted of a 4-5 hours resuscitation step to recover injured cells, followed by overnight incubation at 42 C on *V. parahaemolyticus* Sucrose (VPS) agar, a new selective and differential medium. The confirmation rate of typical colonies on VPS agar was greater than 98%. The new method produced significantly higher counts of *V. parahaemolyticus* than the FDA method ($P > 0.01$) when tested with chill-, freeze- or heat-stressed samples, and was equivalent to the FDA method ($P > 0.05$) for recovery of osmotically stressed *V. parahaemolyticus*. AA

- 3031 DUPRAY (E) and CORMIER (M). Optimal enrichment time for isolation of *Vibrio parahaemolyticus* from seafood. *Appl. Environ. Microbiol.* 46(5); 1983; 1234-5

The growth of *Vibrio parahaemolyticus* in a liquid medium was compared with that of human fecal flora and estuarine flora. No marked differences were noted between growth at 25 and 37 C for *V. parahaemolyticus*. However, the marine organisms were strongly inhibited when incubated at 37 C. Incubation for 8 hours in an enrichment broth yielded *V. parahaemolyticus* growth, even with a small inoculum, whereas the marine and fecal floras were inhibited. AA

FISH

- 3032 MAY (TW) and KAISER (ML). Evaluation of cryogenic impact grinding technique for powdering whole fish for metal determinations. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 589-93

The cryogenic grinding technique described in the paper consists in affecting brittle fracture of fish by impact pressure. The particle size in ground powder was less than 100 μm . This technique could produce uniform homogenate from whole ground fish. The possibility of alleviating the con-

tamination of sample with Fe, Mo, and Ni by using non metallic coatings (for example Teflon) to ferromagnetic grinder components has been indicated. JVS

- 3033 OKUZUMI (M), YAMANAKA (H) and KUBOZUKA (T). Occurrence of various histamine forming bacteria on/in fresh fishes. *Bull. Jpn. Soc. Sci. Fish.* 50(1); 1984; 161-7

The histamine forming bacteria found in the thirteen red meat samples were N-group bacteria, *Proteus morganii*, *P. vulgaris*, *Hafnia alvei*, *Citrobacter* spp., *Aeromonas* spp., etc. For the summer samples, *P. morganii* were found most frequently followed by the N-group bacteria. KAR

SHARK

- 3034 SHENOY (AS) and DEY (VK). Shark and its utility. *Seafood Export. J.* 16(1); 1984; 5-11

Sharks constitute about 3% of total marine landing in India, and are a valuable catch as almost all parts of sharks can be used. The processing technology for shark liver oil, shark skin, shark meat, shark fish meal and fertilizer and shark fins has been presented in outline. A marketing programme has to be developed for these products. KMD

CARP

- 3035 ABSAR-UL-HASNAIN. Proteolytic contamination of carp myosin preparations revealed by thermal treatment. *Indian J. Exp. Biol.* 22(3); 1984; 172-3

When pure carp myosin was subjected to thermal treatment for 4 hours at 20-40 C, a sudden and remarkable increase in the amount of protein was noted in the supernatant of the myosin treated at 40 C. As temperature alone cannot fragment the heavy chain of myosin, the additional protein is presumed to have been formed by a contaminating protease which is active at 40 C and pH 7.5. It is concluded that (a) care must be taken in reporting the reactions of unstable myosin at higher temperature; and (b) in tropical countries where ambient temperature >30 C are not unusual, such contaminants may affect fish quality. KMD

COD

- 3036 OHSHIMA (T), WADA (S) and KOIZUMI (C). Enzymatic hydrolysis of phospholipids in cod flesh during storage in ice. *Bull. Jpn. Soc. Sci. Fish.* 50(1); 1984; 107-14 (Japanese)

The contents of phosphatidylcholine (PC) and phosphatidylethanolamine (PE) in the flesh decreased slowly during first 4 days of storage and then rapidly to 20 days. There after the decrease of the contents also ceased. During storage for 30 days, 72.2% of PC and 71.8% of PE were hydrolysed. KAR

MACKEREL

- 3037 ANTONY (KP), GEORGE (C) and GOVINDAN (TK). The effect of chemical treatment and packaging on keeping qualities of salted and dried mackerel (*Rastrelliger kanagurta*). *Perfectpac.* 24(1); 1984; 17-23

Salted and sundried mackerels were treated with two preservative mixtures, viz. (i) sodium propionate, sodium sulphite, and BHA, and (ii) sodium benzoate, sodium acid phosphate, potassium sorbate, and BHA. Samples subjected to these treatments were packed in LDPE (100 and 200 gauge) and stored under ambient conditions. Samples given treatment (ii) and packed in 200-gauge pouches had the longest storage life; however, the results obtained with the other treatments were also satisfactory. BSN

SHELL FISH

- 3038 DePAOLA (A), PRESNELL (MW), MOTES (ML) Jr., McPHEARSON (RM), TWEDT (RM), BECKER (RE) and ZYWNO (S). Non-01 *Vibrio cholerae* in shell fish, sediment and waters of the U.S. Gulf Coast. *J. Food Prot.* 46(9); 1983; 802-6

PRAWN

- 3039 CHANDRASEKARAN (M), LAKSHMANAPERUMALSAMY (P) and CHANDRA MOHAN (D). Occurrence of *Vibrio* during fish spoilage. *Curr. Sci.* 53(1); 1984; 31-2

Penaeus indicus collected from Cochin backwaters were stored as 'whole', headless, peeled and undeveined (PUI) and peeled and deviened (PD) at 28, 4 and -18 C for 100 days. At 28 C, *Vibrio* sp. dominated all the samples during the storage. At 4 C, *Vibrio* formed a predominant flora constituting a component of late spoilers on a few occasions. Prawns stored at -18 C showed disappearance of *Vibrio* sp. during storage, but the reoccurrence at a few instances was also noticed on whole fish even on the 100th day. KAR

SHRIMP

- 3040 BATAILLE (MP) and BATTAILLE (PF). Extraction of proteins from shrimp processing waste. *J. Chem. Technol. Biotechnol.* 33B(4); 1983; 203-8

Upto 70% of the theoretical protein content of shrimp waste was recovered by a boiling water extraction method. Digestion time, volume and concentration of calcium hydroxide were varied to optimise the yield of dry matter recovered on processing the shrimp waste. Amino acid analysis was carried out to characterise the protein content of the dry matter. AA

SQUID

- 3041 RAGHUNATH (MR). Soluble nitrogen losses in squids (*Loligo duvauceli*) during storage in slush ice. *J. Food Sci. Technol.* (India) 21(1); 1984; 50-52

Dressed fresh squids were kept in ice water (1:2:0.2) mix enclosed from outside by an insulated aluminium ice box. Melt water was drawn at 2 hour intervals and analysed for total N (TN), and nonprotein N (NPN). During 8 hour storage the TN in melt water increased from 0.3 to 3.5 mg/ml and the increase of NPN was from 0.23 to 3.05 mg/ml. The moisture content of squids increased from 78.33 to 83.08% and the solids lost was about 3% of the fresh weight of squid mantles during 8 hour storage. As the loss in solids leached out occurs mainly in NPN fraction, this could affect the organoleptic quality of the squids. KAR

- 3042 MATSUI (M), ISHIBASHI (T) and KAWABATA (T). Effect of broiling temperatures on the formation of *N*-nitrosodimethylamine from dried squid products. *Bull. Jpn. Soc. Sci. Fish.* 50(1); 1984; 151-4

The paper deals with the mechanism of *N*-nitrosamine formation from dried squid upon broiling with special reference to *N*-nitrosodimethylamine (NDMA) formation at different broiling temperatures in various gaseous atmospheres.
KAR

- 3043 MATSUI (M), ISHIBASHI (T) and KAWABATA (T). Precursors of *N*-nitrosodimethylamine formed in dried squid upon broiling. *Bull. Jpn. Soc. Sci. Fish.* 50(1); 1984; 155-9

It was found that the most important and principal precursor of *N*-nitrosodimethylamine (NDMA) in squid is trimethylaminoxide, which is abundant in squid muscle and is easily converted to dimethylamine upon broiling, which is known to be easily nitrosated under acidic conditions to form NDMA.
KAR

PROTEIN FOODS

Nil

FRUIT JUICES AND BEVERAGES

FRUIT JUICES

- 3044 MAIWALD (H-J), TAUFEL (A), HOPPE (K), NIELEBOCK (C) and GLOWACZ (S). Cariogenicity of beverages. *Ernährungsforschung.* 28(4); 1983; 110-11 (German)

The cariogenic effect of a fruit juice beverage "Apfel" containing varying amounts of sucrose has been studied. The sucrose-free beverage did not reduce the pH of the plaque below the value 5.5; a sucrose content $\leq$ 1.5% produced only a slight lowering in pH; while beverages with 4% and 7% sucrose produced a sharp and long-lasting fall in pH. Hence, beverages with a sucrose content of 2% are recommended, in order to prevent dental caries.
KMD

ORANGE JUICE

- 3045 BRAUSE (AR), RATERMAN (JM), PETRUS (DR) and DONER (LW). Verification of authenticity of orange juice. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 535-9

Addition of ground water and water in beet syrup to orange juice reduces 180 values, and enables the detection of nonauthentic products. JVS

APPLE JUICE

- 3046 SUGAHARA (T), MATSUMOTO (N), SASAKI (H) and AOYAGI (Y). On the preference for apple beverages. *J. Jpn. Soc. Food Sci. Technol.* 30(1); 1983; 8-12 (Japanese)

Effect of the concentration of acid and sugar on the consumer preference for beverages containing 10, 30, 50% apple juice, and also effect of the concentration of apple juice on the taste of beverages were examined by means of organoleptic test. (1) For the beverages containing 30% apple juice, the beverage containing 0.45% acid were preferred significantly, at 5% significant level, rather than that containing 0.25% acid, but there was no significant difference in the preference for beverages having different acid concentrations when the beverages contained 10 or 50% apple juice. Beverages with a brix of 13.0 to 12.0 tended to be preferred when the beverages contained 10, 30, or 50% juice. (2) Acid taste of the beverages increased in proportion to the acid concentration, it was also affected by the amount of sugar added; acid taste was lowered with the addition of sugar. Sweetness was also lowered with increasing acid concentration, but its effect was not so much as that of sugar on the acid taste. (3) The balance between acid taste and sweetness tended to coincide with overall impression. This correlation was examined by comparing the sugar to acid ratio; there was no particular sugar to acid ratio preferred always, but the content of sugar was a more decisive factor in determining preference. (4) Beverages containing 50 or 30% apple juice were preferred more than those containing 10 or 100% apple juice, with the difference being statistically significant. AA

COFFEE

- 3047 HANUMANTHA RAO (H). A new portable unit for pulping coffee. *Indian Coffee*. 48(2/3); 1984; 3-4, 20

The unit comprises a water tank (1.3 x 1.3 x 1.3 m) of capacity 1,700 l and a cherry loft (capacity 900 l) which has a sloping floor to enable the water to flow out. A small siphon tank (76 x 76 x 91 cm) made of steel is attached to the pulper. The unit is completed by a combined pulper-washer-recycling unit. A small cement concrete foundation at the working site is considered desirable. A Mitsubishi power tiller, with water-cooled engine, is directly coupled to the pulper. It pumps water from the source into the tank, and also recycles the water which is saved through a device in the cherry hopper. The unit can be operated at various sites during the working season, and stored in a convenient place during the off season. It would be particularly useful for co-operatives and public utility services, for hiring out to small coffee growers. KMD

- 3048 JALEEL (SA) and SREEKANTIAH (KR). Application of fungal pectic enzymes in coffee curing. *J. Food Sci. Technol.* (India) 21(1); 1984; 5-8

Attempt was made to breakdown mucilage of pulped Robusta and Arabica varieties of coffee seeds using pectic enzyme concentrate (PEC) obtained from *Aspergillus carbonarius*. Liquid PEC at concentration of 0.5 to 5.0% were added to pulped seeds and allowed for 60 minutes and the spent enzyme solution was drained followed by washing and sun-drying of seeds. Liquid PEC at 2-3% level solubilized the entire mucilaginous material on the seeds. The enzyme treatment increased the solids content and reducing sugar in the run-off liquid which could be utilized for fermentation after supplementation. Mucilage covering of seeds could be completely removed by immersing for 60 minutes, with stirring the contents once in 10 minutes. The water needed to process about 2.5 kg of berries was 3 litres. KAR

CHICORY

- 3049 ARYA (PS) and SAINI (SS). 'Kalpa Sel I' chicory: An ideal flavouring agent for coffee. *Indian Hortic.* 28(4); 1984; 55-6

WINE

- 3050 RAPP (A), MANDERY (H) and HEIMANN (W). Investigations into the volatile ingredients of rectified grape must concentrate. *Dtsch. Lebensmittel-Rundschau.* 79(11); 1983; 361-5 (German)

BEER

- 3051 MUKE (O), HEIDRICH (G), KORBER (K) and PEUCKERT (W). The colloidal stability of beer. Part 1. Influencing factors and their analytical measurement. *Lebensmittel-industrie.* 30(4); 1983; 173-8 (German)

The colloidal stability of beer is determined primarily by the interactions between protein and polyphenol compounds. But the influence of other compounds may increase dramatically under suitable external conditions. Hence, in this first of five papers, the authors have reported certain analytical methods for the determination of substances responsible for colloidal turbidity in beer. They are: (i) a gas-chromatographic method for determination of high-molecular proteins in beer; (ii) various spectrophotometric methods for the characterization of the tannin/carbohydrate ratio; and (iii) a modified ammonium sulphate titration for determining the effectiveness of the protein stabilization process. KMD

OILS AND FATS

- 3052 DIETSCH (Von W). A contribution to determine the hoeppler-hardness. *Fette Seifen Anstrichm.* 85(4); 1983; 157-62 (German)
- 3053 CHUNG (OK) and POMERANZ (Y). Recent trends in usage of fats and oils as functional ingredients in the baking industry. *J. Am. Oil Chem. Soc.* 60(11); 1983; 1848-51

Recent trends in the baking industry, are to reduce the total amount of fats and oils used in baked goods, and to replace plastic fats with liquid vegetable oils. Whenever the latter are used, a small amount of surfactant is required. These trends facilitate the tailoring of bakery products so as to ensure (i) the right balance of nutrients, (ii) the implementation of dietary recommendations, (iii) an increase in components like fibre, essential fatty acids, medium-chain triglycerides and monoglycerides rather than in triglycerides, and (iv) a decrease in components like salt and milk. KMD

OILS

- 3054 MIRALLES (J). Search for new sources of vegetable oil. *Oleagineux.* 38(12); 1983; 665-7 (French)

The fatty acid composition of oils obtained from the seeds of 5 Senegalese

plants - viz., *Caryophyllum inophyllum*, *Carica papaya*, *Carapa porcera*, *Khaya senegalensis*, and *Hyptis suaveolens* - have been reported. The cultivation of these plants in marginal soils appear to be of some economic interest. *Caryophyllum inophyllum*, *Carapa porcera*, and *Khaya senegalensis* are of interest because of their very high oil yield, *Hyptis suaveolens* because of its great richness in essential fatty acids (79.9% linoleic acid), and *Carica papaya* because of the utilization of its by-products (viz. the seeds).
KMD

GROUNDNUT OIL

- 3055 POMINSKI (J), PEARCE (HM), SPADARO (JJ) and BAXLEY (JR). Improved methods for removing oil from "Difficult-to-press" peanuts. *Peanut Sci.* 10(2); 1983; 82-4

In pressing peanuts for subsequent use in partially defatted products, the oil is difficult to remove in certain lots of peanuts. New laboratory procedures showed increased yields of oil obtained from "difficult-to-press" (DTP) peanuts by mixing them with "easy-to-press" (ETP) peanuts on a 50-50 basis or by drying them to a moisture level between 4.3 and 4.7%. Oil yields by pressing are little affected when peanuts are stored at temperatures of 4.4 (40F) and 23.9 C (75F) for periods of up to 12 months.
AA

SUNFLOWER SEED OIL

- 3056 DREHER (ML), ROATH (WW), HOLM (ET) and D'APPOLONIA (B). Yield, characteristics and composition of oil-type hybrid sunflower seed grown in North Dakota. *J. Am. Oil Chem. Soc.* 60(11); 1983; 1876-7

BAUHINIA OIL

- 3057 ZAKA (SH), SALEEM (M), SHAKIR (N) and AHMAD KHAN (S). Fatty acid composition of *Bauhinia variegata* and *Bauhinia malabarica* seed oils - Comparison of their physico-chemical properties. *Fette Seifen Anstrichm.* 85(4); 1983; 169-72

LEMON OIL

- 3058 LODGE (N), PATERSON (VJ) and YOUNG (H). Physico-chemical composition of New Zealand lemon oil. *J. Sci. Food Agric.* 35(4); 1984; 447-51

New Zealand lemon oil is produced from the cultivar *Villafranca* grown on the root stock of *Citrus sinensis*. It showed: specific gravity (20 C/20 C), n_D^{20} , 1.4778; optical rotation, +53.30; evaporation residue 2.5%; aldehyde 4.23%; and ester number 8.02. The low optical rotation was due to a higher β -pinene to limonene ratio than is usual in cold pressed lemon oils.
JVS

MALVA PARVIFLORA OIL

- 3059 AHMAD (MU), SINHA (S), HUSAIN (SK) and OSMAN (SM). The nature of the oxygenated fatty acids present in *Malva parviflora* seed oil. *J. Sci. Food Agric.* 35(4); 1984; 408-14

The epoxy and conjugated dienol acids were isolated as their methyl esters by employing preparative thin layer chromatography. They were characterised as *cis*-12, 13,-epoxy-*cis*-9-octadecenoic acid 13-hydroxy-*cis*-9, trans-11-octadecadienoic (coriolic acid). JVS

OLIVE OIL

- 3060 KARAPINAR (M) and WORGAN (JT). Effect of substrate pretreatment on microbial fermentation of olive oil solid waste. *Chem. Microbiol. Technol. Lebensmittel.* 8(1); 1983; 19-23

The effect of different concentrations of NaOH treatment on the microbial digestibility of olive oil solids waste (press-cake) was investigated. Treatment with 2% NaOH for 15 minutes at 115 C (10 psig) increased the cellulose breakdown from 16.1 to 52.9% by *Sporotrichum pulverulentum* and from 18.8 to 34% by *Trichoderma viride*. These organisms gave a product containing 24.9% and 23.8% protein respectively in 3 days incubation. AA

TAGETES ERECTA OIL

- 3061 GARG (SC) and DENGRE (SL). Antifungal activity of the essential oil of the *Tagetes erecta* RAK. 33(10); 1983; 218

FATS

- 3062 BERG (Von TGO) and BRIMBERG (UI). Kinetics of fat crystallization. *Fette Seifen Anstrichm.* 85(4); 1983; 142-9 (German)
- 3063 SZCZEPANSKA (H) and CHMIELARZ (B). Analytical problems in the investigation of unsaturated acids conversion II: Determination of position isomers, conjugated unsaturated bonds and composition of fatty acids. *Fette Seifen. Anstrichm.* 85(4); 1983; 150-57
- 3064 SITARAMAM (BS), KRISHNAMURTI (N), CHATTERJEE (PC) and SIVASAMBAN (MA). Vinyl monomers from stearic acid. Their characterization and separation. *Fette Seifen Anstrichm.* 85(4); 1983; 162-8
- 3065 SPERLING (LH) and MANSON (JA). Interpenetrating polymer networks from triglyceride oils containing special functional groups: A brief review. *J. Oil Chem. Soc.* 60(11); 1983; 1887-92

GROUNDNUT BUTTER

- 3066 TARTAR (EJ), HANCHAY (JP) and SCOTT (PM). Improved liquid chromatographic method for the determination of aflatoxins in peanut butter and other commodities. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 597-600

TALLOW

- 3067 LEE (BE), LACROIX (MD), DUPONT (GA) and SCOTT (JA). Capillary gas chromatography determination of pentachlorophenol residues in tallow following automated gel permeation cleanup. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 546-8

The method uses automated gel permeation chromatography (GPC) which eliminates all problems associated with liquid-liquid partitioning for tallow. The appropriate GPC fraction is derivatised with diazomethane, and finally cleaned up with Florisil to remove most of the interferences to GC analysis with electron capture detector (limit of detection 0.001 ppm). JVS

SPICES AND CONDIMENTS

- 3068 GALLI (A) and BRIGUGLIO (D). Microflora of spices and dehydrated herbs. *Ind. Aliment.* 22(9); 1983; 618-23, 629 (Italian)

A total of 79 spices and dehydrated herbs from various sources was investigated. High total viable numbers of aerobic sporeformers generally were present; often several moulds were detected. Bacteria of public health significance were rather absent. The microbial count increased by milling procedures. AA

TURMERIC

- 3069 SMITH (RM) and WITOWSKA (BA). Comparison of detectors for the determination of curcumin in turmeric by high-performance liquid chromatography. *Analyst.* 109(3); 1984; 259-61

The ultraviolet spectrophotometric and electrochemical methods for estimation of curcumin from turmeric powder has been compared. Data on retention indices of the major constituents in different eluents have been reported. To reduce separation times, a solvent extraction procedure has been developed. BSN

CLOVE

- 3070 GOPALA KRISHNAN (M), PADMA KUMARI (KP), NARAYANAN (CS) and MATHEWS (AG). Lipid components of clove. *J. Food Sci. Technol.* (India) 21(1); 1984; 52-3

Gas chromatographic analysis of the clove oil indicated that the main fatty acid esters to be linoleic and palmitic acids. The saturated to unsaturated fatty acid ratio was 1:0.89. The waxy compound from fraction I was further analysed and the compound was found to be $C_{31}H_{64}$. KAR

JALAPENO PEPPER

- 3071 RYMAL (KS), COSPER (RD) and SMITH (DA). Injection-extraction procedure for rapid determination of relative pungency in fresh Jalapeno peppers. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 658-9

A unique injection-extraction procedure allowing the direct spectrophotometric determination of relative pungency of fresh Jalapeno pepper is described.

Intact pepper pods were injected with absolute methanol, using a hypodermic syringe. After 30 minutes, pods were flushed with additional methanol, and capsaicinoids in the extract were determined by absorbance at 275 nm. Mean percent recovery was 66.5%, $s_{\bar{x}} = 3.43$. The method eliminates the time consuming chromatographic cleanup needed with other spectroscopic methods. AA

MACE

- 3072 PRAKASHCHANDRA (KS) and CHANDRASEKHARAPPA (G). Lipid profile and fatty acid composition of fat extracted from arils (mace) of *Myristica fragrans* and seeds of *Artocarpus hirsutus*. *J. Food Sci. Technol.* (India) 21(1); 1984; 40-42

The mace (*Myristica fragrans*) and the seed fat of wild jack fruit (*Artocarpus hirsutus*) contained 21.6 and 24.4% of total lipids (Chloroform-methanol 2:1 v/v). Chloroform-soluble lipids constituted (as % weight) 83 and 88 made up of neutral lipids 60 and 63, glycolipids 27 and 21 and phospholipids 13 and 16 respectively. Neutral lipids were mostly glycerides, free fatty acids and hydrocarbons, with free sterols constituting 1.7 and 1.3% and sterol esters 0.9 and 5.6% in *M. fragrans* and *A. hirsutus* respectively. Palmitic acid is predominant, followed by oleic acid, in all classes of mace lipids, and linoleic acid, is more followed by palmitic in *A. hirsutus* seed lipids. KAR

SENSORY EVALUATION

- 3073 MATZIK (B) and KETTERN (E). Neutralizing agents for sensory testing. Investigations into the efficacy of a number of neutralizing agents. *Dtsch. Lebensmittel-Rundschau* 79(11); 1983; 376-82 (German)

The literature on neutralizing agents used in sensory testing has been surveyed and discussed. The authors then report the results of their tests on the efficacy of three neutral tasting substances - namely, demineralized water, black tea (weak in aroma), and white bread - as neutralizers during the sensory evaluation of a German edam cheese having 40% fat (on dry weight basis) and a distinct but not strong or extremely one-sided flavour. Triangle tests were used to evaluate the neutralizing agents. In none of these trials was it possible to find any statistically significant effect on the capacity to perceive any of the four fundamental tastes. Hence, it was not possible to draw any conclusion regarding the mode of action of the taste neutralizing agents. KMD

- 3074 WALKING (AE) and GOETZ (AG). Instrumental determination of flavour stability of fatty foods and its correlation with sensory flavour responses. *CRC Crit. Rev. Food Sci. Nutr.* 19(2); 1983; 99-132

Discusses: GC of flavour volatiles; GC-MS analysis of volatiles; correlation studies with flavour panel responses; and instrumental or sensory or both. BSN

- 3075 WATANABE (H), SUZUKI (T), TAKAI (R), NISHINA (A) and HASEGAWA (H). Ostwald flow behaviour of several foods. *J. Jpn. Soc. Food Sci. Technol.* 30(1); 1983; 33-7 (Japanese)

Viscosities of mayonnaise, tomato ketchup, sauce and miso were measured

in a considerably wide range of shear rate ($2 \sim 1 \times 10^5 \text{ sec}^{-1}$) by using a capillary flow viscometer. It was found that these food materials showed the Ostwald flow behaviour. The flow curves of these materials could be well fitted to Cross' flow equation. AA

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

- 3076 GRANGER (NA) and GOODMAN (WG). Juvenile hormone radioimmunoassays. Theory and practice. *Insect. Biochem.* 13(4); 1983; 333-40
Discusses: development of existing JH antisera; specificities of existing JH antisera; problems with RIAS: inadequate antiserum specificity; problems with existing RIAS; non-immunological inhibition; and application of existing RIAS. BSN
- 3077 SAHU (RC) and HAMEED (SF). Pheromones in insect control. A review. *Pesticides.* 17(12); 1983; 18-20
Review covers: pheromones in insect control; species specificity; environmental and physiological conditions; survey of pest insects; pheromone baited trap for direct control of insect pests; and use of combined pheromones. BSN
- 3078 McGAUGHEY (WH). Compatibility of *Bacillus thuringiensis* and captan when used in a mixture for treating seed corn for moth control. *J. Econ. Entomol.* 76(4); 1983; 897-8
Captan (Orthocide) in aqueous suspension at 58.6 mg of AI/ml prevented germination of *Bacillus thuringiensis* Berliner (Dipel) spores but did not kill the spores. Upon dilution with water, spores that had been incubated with captan for 4 hours germinated and produced colonies on agar plates. Captan had no effect on the toxicity of *B. thuringiensis* to almond moths, *Ephestia cautella* (Walker), and only a slight negative effect on toxicity to Indianmeal moths, *Plodia interpunctella* (Hubner), perhaps because of its effects on the spores to which this species is susceptible. Captan alone was slightly toxic to these insect species, but it did not increase the toxicity of *B. thuringiensis* in mixtures. AA
- 3079 BAKER (JE). Properties of amylases from midguts of larvae of *Sitophilus zeamais* and *Sitophilus granarius*. *Insect. Biochem.* 13(4); 1983; 421-8
- 3080 TAYLOR (CE), QUAGLIA (F) and GEORGHIOU (GP). Evolution of resistance to insecticides: A case study on the influence of migration and insecticide decay rates. *J. Econ. Entomol.* 76(4); 1983; 704-7
Computer simulations have shown that evolution of resistance to insecticides can sometimes be controlled when heavy doses of short-lived insecticides are used in the presence of a small influx of susceptible immigrants. These predictions were tested with caged populations of *Musca domestica* L. exposed to dieldrin. The fit between the predicted and observed course of evolution was generally good. Resistance evolved faster with a slowly decaying than with a rapidly decaying pesticide. AA

- 3081 WHITE (NDG), NOWICKI (TW) and WATTERS (FL). Comparison of fenitrothion and malathion for treatment of plywood and galvanized steel surfaces for control of the red flour beetle (Coleoptera: Tenebrionidae) and the rusty grain beetle (Coleoptera: Cucujidae). *J. Econ. Entomol.* 76(4); 1983; 856-63

Fir plywood and galvanised steel panels were treated with either 0.25 or 0.50 g/Al/m² of fenitrothion or malathion spray. Panels were stored at 25 ± 2 C and bioassayed after 1,2,4,8,16 and 35 weeks with adult *Tribolium castaneum* or adult *Cryptolestes ferrugineus* using exposure periods of 1,3 or 6 hour at 30 ± 1 C, 75 ± 2% RH. Over 35 weeks malathion was significantly more toxic than fenitrothion at 0.5 g Al/m². The type of surface did not affect the relative toxicity of the chemicals except that with malathion at 0.50 g Al/m². *C. ferrugineus* mortality was significantly higher on steel than on plywood-fenitrothion levels in rapeseed were consistently higher were malathion levels. KAR

- 3082 SLAHCK (SC). Liquid chromatographic determination of propoxur in technical and formulated products: Collaborative study. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 497-9

The propoxur is a widely used carbamate pesticide popular for its specificity and low mammalian toxicity. Formulations of propoxur are extracted with acetonitrile and analysed by reverse phase chromatography with *N*-butyrophenone as the internal standard. JVS

BIOCHEMISTRY AND NUTRITION

- 3083 WEINER (R). Bile acid circulation and fat resorption. *Ernährungsforschung.* 28(3); 1983; 72-74 (German)

The authors have, first of all, stated briefly the four steps involved in the digestion and resorption of fat, and then shown the role of bile acid circulation in this process. Some conclusions which can be applied in practice have been reached: e.g. the use of medium-chain triglyceride in an enteral diet. KMD

- 3084 SCHOLZ (KE), BEYNEN (AC), TERPSTRA (AHM) and WEST (CE). Influence of different food proteins on the cholesterol concentration in serum. *Ernährungsforschung.* 28(3); 1983; 67-72 (German)

The authors have summarized the research on atherosclerosis and serum cholesterol since the year 1909. They have also shown how 25% casein in the diet leads to a rise in serum cholesterol, while no such rise is observed when the casein is replaced by wheat protein, groundnut protein, or soy protein. KMD

- 3085 ANDERSON (TR) and QUICKE (GV). An isotopic method for determining chemically reactive lysine based on succinylation. *J. Sci. Food Agric.* 35(4); 1984; 472-80

In the method described in this paper, maximal succinylation was achieved by using guanidine hydrochloride and excess of succinic anhydride (¹⁴C) relative to total lysine residues. Unwanted O-succinyl esters are removed by treatment with hydroxylamine for 5 minutes at pH 13 and 25 C. Succinylated proteins was precipitated with trichloroacetic acid, residual label washed

out with ethyl alcohol and the labelling measured in a scintillation counter. The values obtained by this method were close to theoretical values of lysyl residues in egg white lysozyme, bovine haemoglobin, ovalbumin and bovine serum albumen. JVS

- 3086 NICOLSON (IA), MACRAE (R) and RICHARDSON (DP). Comparative assessment of high-performance liquid chromatographic methods for the determination of ascorbic acid and thiamin in foods. *Analyst*. 109(3); 1984; 267-71

A comparative assessment of HPLC methods for vitamin analysis was designed in which a number of institutions were asked to carry out the determination of ascorbic acid and thiamin in three samples (1, a mixture of thiamin and ascorbic acid in glucose; and 2 and 3, fortified breakfast cereals). Coefficients of variation between laboratories for sample 1 (ascorbic acid 5.6 and thiamin 6.9%) were much lower than for samples 2 and 3 (ascorbic acid 23 and 19% and thiamin 47 and 34%, respectively, the latter being considerably greater than is desirable. It is concluded that HPLC will not become a widely accepted technique for the determination of vitamins in foods until all the stages of the analysis, including extraction, clean-up and HPLC, are thoroughly validated. AA

- 3087 CHEN (MF), HILL (JW) and McINTYRE (PA). The folacin contents of foods as measured by a radiometric microbiologic method. *J. Nutr.* 113(11); 1983; 2192-6

The folacin content of 16 foods measured by the radiometric microbiologic method ranged from 9 µg/ml - 1820 µg/100g, which is found to compare well with that obtained by turbidimetric microbiologic method. KAR

- 3088 BOURGEOIS (CF), PAGES (PS), CZORNOMAZ (AM), ALBRECHT (ML), CRONENBERGER (LA) and GEORGE (PR). Specific determination of α-tocopherol in food and feed by fluorometry. I. Manual method. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 627-30

Alpha-tocopherol accounts for 80% of vitamin E supply in foods. Its determination is somewhat difficult since eight natural homologues (4 tocopherols and 4 tocotrienols) possess vitamin activity. The food is saponified and the unsaponified fraction is extracted with ethyl ether or preferably extrelnt-columns. Isooctane is employed as the carrier solvent for eluting the extract containing alpha-tocopherol. An aliquot of isooctane extract is evaporated and residue dissolved in ethanol. Tocopherols and tocotrienols other than alpha-isomers are eliminated after nitrosation. Alpha-tocopherol is oxidised to alpha-tocored (α-TR) after adding specific reagents. The alpha-TR is condensed into 4,5-dimethyl-O-phenylenediamine to obtain the highly fluorescent phenazine. The fluorescence due to alpha-tocotrienol can be quenched by adding iodine and bromine. JVS

- 3089 BOURGEOIS (CE), GEORGE (PR) and CRONENBERGER (LA). Automated determination of α-tocopherol in food and feed. Part 2. Continuous flow technique. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 631-4

The proposed method is a continuous flow method with fluorometric detector. It has been adopted from the manual method. JVS

- 3090 SCHWEIZER (TF), FROLICH (W), DEL VEDOVO (S) and BESSON (R). Minerals and phytate in the analysis of dietary fiber from cereals. I. *Cereal Chem.* 61(2); 1984; 116-9

- 3091 BJORCK (I), NYMAN (M) and ASP (NG). Extrusion cooking and dietary fiber: Effects on dietary fiber content and on degradation in the rat intestinal tract. *Cereal Chem.* 61(2); 1984; 174-9
- 3092 CROWE (P), BAIRSTOW (P) and BOOTH (C). Social aspects of food and health. A comparative view. *J. Food Nutr.* 40(4); 1983; 176-80
- 3093 REDDY (V). Nutritional problems in India. *J. Food Nutr.* 40(4); 1983; 157-60
Discusses: protein energy malnutrition; nutritional blindness; nutritional anaemia; endemic goitre; pellagra; fluorosis; and other nutritional disorders. BSN
- 3094 KHAN (MA) and RAO (RM). Nutritional quality of meals served by selected foodservices. *CRC Crit. Rev. Food Sci. Nutr.* 19(2); 1983; 151-71
- 3095 BHAT (CM) and KHETERPAL (N). Infant feeding and weaning practices in a selected village of Hissar district. *Indian J. Nutr. Dietet.* 20(10); 1983; 30

TOXICOLOGY AND HYGIENE

- 3096 FLANJAK (J) and SHARRAD (J). Quantitative analysis of styrene monomer in foods. A limited East Australian survey. *J. Sci. Food Agric.* 35(4); 1984; 457-62
- 3097 VARNER (SL) and BREDER (CV). Determination of residual levels and migration of benzene from styrene containing polymers. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 516-20
Styrene (for which benzene is the starting material) is widely used in monomers in food contact packaging systems. The polymer was dissolved in dimethylacetamide-water and passed through a column of 20% SP 2100-0.1% carbowax 1501. A flame ionisation detector was used for quantitation. Average recovery of benzene was more than 85%. JVS
- 3098 ABBAS (HK), SHIER (WT) and MIROCHA (CJ). Sensitivity of cultured human and mouse fibroblasts to trichothecenes. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 607-10
By using cultural human and Swiss mouse diploid fibroblasts, biological assay of T-2 toxins at 100 Pg/ml and a crude extract of *Fusarium tricinatum* was found to be possible and reliable. Cells are cultured with toxins for 3-4 days, fixed and stained to furnish a permanent record of results. JVS
- 3099 WOLFF (J), OCKER (H-D) and ZWINGELBERG (H). Determination of ergot alkaloids in grain and grain products by HPLC. *Getreide Mehl Brot.* 37(11); 1983; 331-5 (German)
The distribution of alkaloids - e.g. ergometrin - in different mill fractions has been studied, and the distribution of ergot during the milling process deduced. When grain is milled to a high degree, a large proportion of ergot gets into the flour meant for human consumption, and a smaller proportion into the bran; the coarse bran contains much more ergot than the bran. KMD

- 3100 NOWOTNY (P), BALTES (W), KRONET (W) and WEBER (R). Thin layer chromatographic method for the determination of 22 mycotoxins in mouldy food. *Chem. Mikrobiol. Technol. Lebensmittel.* 8(1); 1983; 24-8 (German)

A screening method for the determination of 22 mycotoxins (aflatoxins, citrinin, ochratoxin A, luteoskyrin, mycophenolic acid, cyclopiazonic acid, penicillic acid, patulin, sterigmatocystin, zearalenone, roridin A, verrucaridin A, T-2 toxin, HT-2 toxin, verrucarol, diacetoxyscirpenol, alternariol and alternariol monomethyl ether) with TLC in mouldy food is described. The detection limits are in the range of 5 ppb and 4 ppm, depending on the mycotoxin and the foodstuff. The recoveries in mouldy food, spiked with mycotoxins, are in the range of 50% and 80%. The method has been applied to mouldy food of different households (47 samples) and 200 samples of food inoculated with spores of toxin producing strains. While in the spontaneous moulded food no mycotoxin could be detected, the inoculated samples were normally positive. AA

- 3101 BUCHANAN (RL), HOOVER (DG) and JONES (SB). Caffeine inhibition of aflatoxin production: Mode of action. *Appl. Environ. Microbiol.* 46(5); 1983; 1193-200

Evaluation of caffeine and a number of related methylxanthines indicated that the ability of the compound to inhibit growth and aflatoxin production by *Aspergillus parasiticus* is highly specific and does not involve an inhibition of cyclic AMP phosphodiesterase. Supplementation of the culture medium with purine bases, nucleosides, and nucleotides suggested that the inhibition of fungal growth could be partially overcome by adenine or guanine but that the purines had little effect on the inhibition of aflatoxin production. Likewise, increasing the levels of trace minerals did not overcome the inhibition of toxin production. Electron microscopic evaluation of caffeine-treated and -untreated cultures indicated that the compound produced observable changes in the ultrastructure of the fungus. AA

- 3102 SWANSON (SP), CORLEY (RA), WHITE (DG) and BUCK (WB). Rapid thin layer chromatography method for determination of zearalenone and zearalenol in grains and animal feeds. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 580-88

Method consists in the extraction of feed with 75% methanol, precipitation of pigments with lead acetate, and defatting with petroleum ether. The mycotoxins are partitioned into toluene-ethyl acetate, run through a high performance TLC and detected by using fast violet B solution sensitivity, was better than 80 ng/g for zearalenone and 200 ng/g zearalenol. JVS

- 3103 RAY (B). Cryoprotectants protect lipopolysaccharide molecules of the outer membrane of *Escherichia coli* B from freeze-damage. *J. Food Prot.* 46(10); 1983; 864-7, 872

- 3104 COX (NA), BAILEY (JS) and THOMSON (JE). Evaluation of five miniaturized systems for identifying *Enterobacteriaceae* from stock cultures and raw foods. *J. Food Prot.* 46(10); 1983; 914-6

- 3105 FITTS (R), DIAMOND (M), HAMILTON (C) and NERI (M). DNA-DNA hybridization assay for detection of *Salmonella* spp. in foods. *Appl. Environ. Microbiol.* 46(5); 1983; 1146-51

The DNA-DNA hybridization test for detection of *Salmonella* sp. in foods does not require an initial preenrichment of food samples, but needs selective enrichment. Samples collected on membrane filters were assayed by molecular hybridization to labeled probes. These probes contain DNA sequences

characteristic to genus *Salmonella*. Employing this technique, a number of foods like peanut butter, soy flour, macaroni, chocolate pieces, nonfat dried milk, thawed frozen fish sticks, dried eggs, cheese and sour cream were assayed for presence of *Salmonella*. BSN

- 3106 BAILEY (JS), COX (NA) and THOMSON (JE). Rapid procedure for biochemical characterization and serological confirmation of suspect *Salmonella* isolates. *J. Food Prot.* 46(9); 1983; 764-6
- 3107 LUND (BM) and WYATT (GM). The effect of redox potential, and its interaction with sodium chloride concentration, on the probability of growth of *Clostridium botulinum* type E from spore inocula. *Food Microbiol.* 1(1); 1984; 49-65
- 3108 ALCOCK (S). Elevation of heat resistance of *Clostridium sporogenes* following heat shock. *Food Microbiol.* 1(1); 1984; 39-47
 The effect of sublethal heat on the heat resistance of *C. sporogenes* as influenced by sporulation medium and the pH of the heating medium has been investigated. Heat shock to spores at 80 or 100 C increased their apparent resistance to heating at 121.1 C. Presence of glucose in the medium reduced the percentage heat activation of spores. Heat shock in acid conditions has maximum effect on heat resistance. KAR
- 3109 WANG (Y) and SUGIYAMA (H). Extraction of botulinum toxin with urea-buffer. *J. Food Prot.* 46(10); 1983; 861-3
 From inoculated pack studies using *Clostridium botulinum* spore portions of wieners, tofu and tempeh were extracted with buffers which differed in possessing or not having 2M urea. When tested with extracts made in urea-buffer, more samples showed presence of botulinum toxin. Urea-buffer extracted 30-100% more toxin than normal buffer as shown by LD₅₀ of toxin extracted from wieners. BSN
- 3110 BROUGHALL (JM) and BROWN (C). Hazard analysis applied to microbial growth in foods: Development and application of three-dimensional models to predict bacterial growth. *Food Microbiol.* 1(1); 1984; 13-22
 Mathematical-modelling techniques have been developed which are capable of describing the effect of two environmental variables, plus temperature, on the kinetics of bacterial growth. The models illustrated here demonstrate the effect of water activity and pH on the growth of *Staphylococcus aureus* and *Salmonella typhimurium*. Their application to predict the level of possible bacterial growth in hazard analysis techniques is illustrated. AA
- 3111 DWARAKANATH (CT) and SREENIVASA MURTHY (V). Biochemical activity of Staphylococci isolated during bacteriological survey of catering establishments. *J. Food Sci. Technol.* (India) 21(1); 1984; 1-5
 Staphylococci were isolated from crockery (spoons, plates and coffee cups) drinking water, and food handlers nose, hands and finger nails from 50 catering establishments in a survey conducted in Mysore City (India). Out of 132 strains of Staphylococci isolated 43 (32.57%) were coagulase positive, which were evaluated for TNase activity, enterotoxigenicity, antibiotic sensitivity, phage typing, lysostaphin sensitivity, mannitol fermentation and phosphatase reaction. Thirty seven isolates (86.04%) were positive for TNase activity; 18 out of the 40 coagulase positive isolates (45.00%) elaborated enterotoxin types A-E and AB, predominantly A type. Lysostaphin

sensitivity and phosphatase reactions were 88.8 and 94.4% respectively among enterotoxigenic types. Majority of the typable isolates showed III and IV group phage reactions which are known to include enterotoxigenic types. Antibiotic sensitivity showed 92.67% resistance towards penicillin among the coagulase positive types and 98.87 and 17.97% resistance towards penicillin and lincomycin respectively among coagulase negative types. This points to the indiscriminate use of antibiotics leading to the prevalence of drug resistant Staphylococci in catering establishments. KAR

- 3112 LEELA (RK). and SANKARAN (R). Effect of dehydration freezing and freeze-drying on morphological, immunological and biochemical characteristics of enterotoxigenic staphylococci. *Chem. Microbiol. Technol. Lebensmittel.* 8(1); 1983; 11-14

I N D E X

Adansonia digitata See baobab seed

Additives, EEC numbers 2845

Aflatoxin

extraction from groundnut by AOAC
method 2919

groundnut 2918

groundnut butter 3066

inhibition by caffeine 3101

ogi 2899

Aflatoxin M₁, cheese 2993-4

Alcoholic products, synthetic dyes

determination, HPLC 2848

Alcohol production from maize, effect
of irradiation 2892

Algae production 2837

Amylase activity

cereals 2856

fungus 2856

Amylose

cereal starch, determination

colorimetry 2857

rice starch 2862

Anaerobic method 2841

Analytical chemistry 2827

Analytical method

random error 2828

Antifungal activity of *Tagetes erecta*

oil 3061

Apple

ascorbic acid stability 2936

microbiology 2944

packaging 2816

storage 2945

Apple juice 3046

Apple products

counter current extraction 2937

microbiology 2944

Ascorbic acid

food, determination, HPLC 3086

fruits and fruit products, stability
2936

Aspartame in beverages, determination,

LC 2852-3

Atomic absorption spectrometry 2823

Avocado

chilling

effect on ethylene production 2943

effect on respiration 2943

Bacillus stearothermophilus spoilage
of canned green bean 2904

Bacillus thuringiensis, corn moth

control 3078

Bacon

Clostridium botulinum inhibition 3021

nitrosopyrrolidine determination 3022

Bacteria in milk, isolation and identi-
fication 2980

Bacterial fermentation of cellulose
2843

Bacterial thermal death time determina-
tion, DSC 2842

Bacteriological quality of seafood 3029

Bacteriology 2841

Bajra flour hydration 2858

Bajra starch hydration 2858

Baking test

Japanese 2955

UK 2955

USSR 2955

Banana

ascorbic acid stability 2936

chitin, effect of fungal infection
2938

Baobab seed

nutritive value 2931

Barley

protein 2876

starch

gelatinization 2871

granule size 2871

Bauhinia fatty acid composition 3057

Beef

carcass 3001

colour, effect of cottonseed flour 3003

contamination 3004

keeping quality 3005-6

lipid oxidation effect of cottonseed
flour 3003

minced, keeping quality 3005

packed

microbiological quality 3008

organoleptic quality 3008

Salmonella, effect of temperature 3007

Staphylococcus aureus effect of

temperature 3007

steak

gas packaged, keeping quality 3009

storage 3006

Beer colloidal stability 3051

Beverages, aspartame determination, LC
2852-3

Bile acid circulation and fat absorption
3083

Biscuit microstructure 2967

Blanching winged bean 2906

GENERAL

- 3113 RAY (SK). An empirical investigation of the nature and causes for growth and instability in Indian agriculture: 1950-80. *Indian J. Agric. Econ.* 38(4); 1983; 459-74
- 3114 SAWANT (SD). Investigation of the hypothesis of deceleration in Indian agriculture. *Indian J. Agric. Econ.* 38(4); 1983; 475-96
- 3115 DESAI (GM) and NAMBOODIRI (NV). The deceleration hypothesis and yield-increasing inputs in Indian agriculture. *Indian J. Agric. Econ.* 38(4); 1983; 497-508
- 3116 GREWAL (SS) and RANGI (PS). An analytical study of growth of Punjab agriculture. *Indian J. Agric. Econ.* 38(4); 1983; 509-20
- 3117 VAISHNAV (PH). Some constraints on growth of agricultural output in Punjab. *Indian J. Agric. Econ.* 38(4); 1983; 521-9
- 3118 PATHAK (BS). Energy constraints to agricultural production. *Indian J. Agric. Econ.* 38(4); 1983; 530-38
- 3119 DESAI (DK) and PATEL (NT). Improving growth of foodgrains productivity in the Western region of India. *Indian J. Agric. Econ.* 38(4); 1983; 539-56
- 3120 PANT (SP). Growth and stagnation of agricultural production: A critical analysis (with special reference to Madhya Pradesh). *Indian J. Agric. Econ.* 38(4); 1983; 557-67
- 3121 RAJAGOPALAN (V). Deceleration of rates of agricultural growth in Tamil Nadu: Trends and explanatory factors. *Indian J. Agric. Econ.* 38(4); 1983; 568-84
- 3122 RAJAPUROHIT (AR). Recent trends in agricultural growth rates in Karnataka. *Indian J. Agric. Econ.* 38(4); 1983; 585-90
- 3123 MISRA (B). Deceleration of rates of agricultural growth in Orissa: Trends and explanatory factors. *Indian J. Agric. Econ.* 38(4); 1983; 591-604
- 3124 KHANNA (G). Report of the symposium on constraints to agricultural production in the Northern region of India. *Indian J. Agric. Econ.* 38(4); 1983; 605-9
- 3125 GUPTA (T). Report of the symposium on appraisal of recent trends in agricultural growth in the Western region of India. *Indian J. Agric. Econ.* 38(4); 1983; 610-23
- 3126 PARTHASARATHY (G). Report of the symposium on alleged deceleration of rate of growth of agriculture in the Southern states of India and Orissa. *Indian J. Agric. Econ.* 38(4); 1983; 624-40
- 3127 VOIGT (A). On the "Green Revolution" and its socio-economic consequences in developing countries. *Ernährungsforschung.* 28(3); 1983; 80-84 (German)

- 3128 ANON. "Environment and the Agro-Food Industries". *Ind. Aliment. Agric.* 100(11); 1983; 837-933 (French)
- This special issue contains the following 18 papers. DAVID (JF) - Industrial plants and neighbourhood comfort: Maintenance of environmental conditions and reciprocity in separating distances (p.839-47). FRANCHET (M) - The environment, an element in the selling price (or returns) (p.843-4). LESCURE (JP) - Environment protection in the sugar industry - example of water pollution (p.845-7). CONVERSE (CW) and COLAS (E) - Control of coagulant estimation by the "streaming current detector" (p.849-51). BARRAQUE (C) and NICOL (R) - Demineralization of second carbonation juice on an ion-exchanger, and further treatment of the residual water so produced. (p.853-7). PERRIER (G) - An actual example: the water purification station of the ORLAC Dairy Plant at Vienne-Isere. (p.859-61). DOUARD (P) - The dairy industry: A clean agro-food industry (p.863-5). TILLY (J) - Pollution of water in abattoirs (p.867-9). CATRY (JM) and OGER (L) - Treatment of abattoir effluents by flotation, with a view to utilization of the residue for animal feeding (p.875-8). PELLETIER (JL) - Tilly abattoirs: the GUIC saved? (p.871-3). BOULENGER (P) and BRIENESSE (L) - Combined nitrification and denitrification of used waters by the Carousel process (p.879-83). GAILLAN (D) and SUTTON (PM) - New anaerobic purification processes for industrial effluents (p.885-9). CAMILLERI (C) - Methanization by a fixed biomass (p.884). GUYOT (M) - Purification of brewery effluents, the present technique and its tendencies (p.897-901). GUILLAUMIN (R) and VERMEERSCH (G) - Researches on the prevention of explosions in oil mills (sound reduction) (p.903-14). CAISSES CENTRALES DE MUTUALITE SOCIALE AGRICOLE - The insonorization of a milk powder plant (p.917-23). MATHE (J) - Insonorization (Noise reduction) in a technology-oriented food industry (p.927-31) and SEGALIN (P) - Study on removal of dust from the air in milk dehydration plants of the Mont St. Michel Dairy (p.932-3). KMD
- 3129 SCHMITT (RW). Building R&D policy from strength. *Science.* 220(4601); 1983; 1013-6
- 3130 KEYWORTH (GA). Federal R&D and industrial policy. *Science.* 220(4602); 1983; 1122-5
- 3131 GY (P). Principles and scientific basis of sampling of particulate materials. Part 2. *Ind. Aliment. Agric.* 100(12); 1983; 967-96 (French)
- Sampling is no longer an art requiring "some skill and a little common sense" as stated in the dictionary (1966 Edn) of the U.S. Bureau of Mines. It is a separate science all by itself, and its laws are well defined. Unfortunately, teaching of sampling theory to engineers and technicians is practically non-existent all over the world. This is the conclusion reached after a comprehensive review of sampling of particulate materials. KMD
- 3132 BAUMAN (HE) and TAUBERT (C). Why quality assurance is necessary and important to plant management. *Food Technol.* 38(4); 1984; 101-2
- 3133 BIANCO (LJ). Developing, implementing, and monitoring a basic plant quality control program. *Food Technol.* 38(4); 1984; 102-4
- Quality control is used to check operational variations. The article discusses, guiding principles of quality control (QC), operational procedures for (QC) and sanitation practices. JVS
- 3134 LYONS (RL). Required personnel training in plant quality control. *Food Technol.* 38(4); 1984; 105, 108-10

- 3135 ANDERSON (RM). Controlling food plant quality costs. *Food Technol.* 38(4); 1984; 111-2

The cost of measuring quality control should not outweigh the benefits. With higher levels of sophistication, a point of diminishing returns is reached and hence, a gross measure of costs may be adequate for most firms. The three types of quality costs namely, cost of prevention, cost of appraisal and cost of failure are discussed in detail. JVS

- 3136 HOSKING (G). Quality cost measurement in the food industry. *Food Technol. Aust.* 36(4); 1984; 165-7

The theory behind quality cost studies, available literature, standards and the introduction and operation of quality cost systems are discussed together with the use of these studies for unprocurement and identification of opportunities. AA

- 3137 WINTERMANTEL (JF). Working relationships between users and suppliers of raw materials. *Food Technol.* 38(4); 1984; 113-4

FOOD PROCESSING AND PACKAGING

PROCESSING

- 3138 SULLIVAN (JF) and CRAIG (JC) Jr. The development of explosion puffing. *Food Technol.* 38(2); 1984; 52-5, 131

Explosion puffing is an innovative technique devised to yield products similar to freeze-dried, with rapid rehydration properties, retaining the texture/flavour characteristics of fresh cooked food and lower unit costs. Explosion puffing is incorporated into hot-air dehydration process at moisture contents of 15 and 35% depending upon the commodity. The article provides a description of explosion puffing device (using lab scale as well as commercial cereal puffing gum) and the data on puffing pressure-moisture relationship of potatoes (450 kPa at 25% moisture) and apple (100 kPa at 20% moisture). Schematic representation of a continuous explosion puffing system has been provided. In the case of carrots and celery, the Gardner colour difference values were higher by explosion puffing than by conventional cooking. JVS

- 3139 ANON. Further development in view for extrusion cooking. *Baking Today.* 4(6); 1983; 19-21

Review covering the outline of extrusion cooking and the research project of Flour Milling and Baking Research Association, Chorley Wood. KAR

PACKAGING

- 3140 LORUSSO (S). Factors of physico-chemical instability in preserved foods: Interactions between environment, packaging, and food. *Ind. Aliment.* 22(10); 1983; 725-34 (Italian)

Inter-relations between environment, packaging, and food were derived by studying the physical phenomena of diffusion and movement of substances. The phenomenon of movement depends on: (i) the proximate composition of the food (water and fat percentages being the most important); (ii) the physical

state of the food components (solid, liquid, or semi-solid); and (iii) the packaging process (type of material, time, temperature surfaces which are in extended or limited contact). It has been possible to compile a more precise list of foods of Type 5 which, under the present laws, come into contact with the containers. It has been possible to exclude, or at least minimise, the extractive action of some of them. KMD

- 3141 BRUNETTI (ML), DAGHETTA (A), ROSSMANN (L) and ZANDERIGHI (L). Preservation of food in polymeric packages. 1. Kinetics of chemical degradation of foods *Ind. Aliment.* 22(10); 1983; 735-41 (Italian)

The paper shows how the degradation of a given food over a period of time can be simulated, when the permeability of the packaging material and the degradation kinetic of the food are known. This model is useful for the prediction of the storage behaviour of a food in a given packaging. Several degradation kinetics reported in the literature have been examined, and the practical utilization has been demonstrated. KMD

- 3142 STANNARD (CJ), ABBISS (JS) and WOOD (JM). Combined treatment with hydrogen peroxide and ultraviolet irradiation to reduce microbial contamination levels in pre-formed food packaging cartons. *J. Food Prot.* 46(12); 1983; 1060-64

A treatment combining hydrogen peroxide and ultra-violet (UV-C) irradiation was assessed for reduction of microbial contamination in pre-formed food packaging cartons. There was a synergistic effect between low concentrations (0-5% weight/volume) of hydrogen peroxide and UV-C irradiation (10 s) on spores of *Bacillus subtilis*, the maximum lethality occurring between 0.5 and 1% peroxide. A combined treatment using 1% hydrogen peroxide and 10 s of UV-C irradiation was also effective against a variety of other organisms (spores and vegetative cells). The efficiency of the treatment was dependent on the type of inner surface of the carton. A greater lethal effect was obtained against *B. subtilis* spores in polyethylene-lined carton than in aluminium/polyethylene laminate-lined cartons (5.1 and 3.5 decimal reductions in numbers respectively, using a combined treatment with 1% peroxide and 10 s of UV-C). AA

- 3143 STANNARD (CJ) and WOOD (JM). Measurement of residual hydrogen peroxide in preformed food cartons decontaminated with hydrogen peroxide and ultraviolet irradiation. *J. Food Prot.* 46(12); 1983; 1074-7

A luminometric method was used to determine the levels of residual hydrogen peroxide present in preformed food packaging cartons after a decontamination process using sterile distilled water or 0.1, 1.0 or 30% (weight/volume) hydrogen peroxide and ultraviolet (UV-C), 254 nm) irradiation. The reduction of post-process peroxide levels in the cartons by irradiation or hot air was assessed. A residual hydrogen peroxide level of approximately 100 ppb could be obtained by spraying 0.2 ml of 0.1% hydrogen peroxide into the carton. Treatment with 1% hydrogen peroxide, with or without UV-C irradiation, gave residual levels approximately tenfold higher. The level was not reduced by UV-C irradiation but could be reduced by blowing hot air into the carton. 30% hydrogen peroxide sprayed into cartons could not be reduced by heat to levels below 100 ppb. Extremely low levels of residual hydrogen peroxide were detected when water was sprayed into cartons, both with or without UV-C irradiation. AA

FOOD ENGINEERING AND EQUIPMENT

- 3144 ESENER (AA), ROELS (JA) and KOSSEN (NWF). Theory and applications of unstructured growth models: kinetic and energetic aspects. *Biotechnol. Bioeng.* 25(12); 1983; 2803-41
- 3145 MILLER (RC). Effect of wear on twin-screw extruder performance. *Food Technol.* 38(2); 1984; 56-61
- High shear cooking extrusion has been widely used for producing breakfast cereals, snacks and pet food. In this system, single-screw extruders, have been replaced to some extent by new type of twin screw machines (particularly intermeshing, co-rotating types). This study was conducted on one production line of a commercial dry pet food. It has indicated that twin-screw extruder performance is strongly influenced by screw and barrel wear. The wear was found to be located in several specific areas on the screw and barrel surfaces. It was caused by erosion of the product at high pressure points and lateral movement of extruder shaft caused by unbalanced forces acting on screws. JVS
- 3146 GUPTA (ML). Installation of solar devices using low cost materials. *Invent. Intell.* 18(12); 1983; 512-4
- 3147 GAGLIARDI (GR), SULLIVAN (D) and SMITH (NF). Computer-aided video inspection. *Food Technol.* 38(4); 1984; 53-9
- Carefully designed micro-computer based vision systems are reported to provide cost-effective quality control in food processing plants. The versatility of the computerised inspection system has been diagrammatically represented. Each component of the system can be tailored to suit specific inspection task. JVS

ENERGY IN FOOD PROCESSING

- 3148 SIDAWAY-WOLF (D). An overview of energy use in food and agriculture. *Can. Inst. Food Sci. Technol. J.* 17(1); 1984; 4-13
- 3149 HENON (Y). Energy cost of ionising treatments. *Ind. Aliment. Agric.* 100(12); 1983; 1001-3

FOOD CHEMISTRY AND ANALYSIS

- 3150 BRENNA (O), BOSSI (E), TESTOLIN (G) and CANTONI (C). Presence of nitrosamines in foods. Their effect on the digestive level. *Ind. Aliment.* 22(10); 1983; 742-4 (Italian)
- The amount of dimethyl nitrosamine (DMNA) absorbed on proteins and connective tissue depends on the magnitude of their undigested fraction. The *in vitro* digestion of proteins by pepsin and pancreatin is greatly inhibited by the released DMNA. KMD
- 3151 YAMADA (T), YAMAMOTO (M) and TANIMURA (A). Acceleration of nitrosamine formation by contaminant(s) in sodium chondroitin sulphate preparations. *J. Agric. Food Chem.* 32(3); 1984; 480-83

The secondary amine most commonly found in food is dimethylamine (DMA). The nitrosation of DMA was strongly accelerated by sodium chondroitin preparations (CSS). This was traced to the presence of a dialysable substance in CSS preparation; the potency of this compound was 18 times that of similar weight of sodium thiocyanate or potassium iodide. JVS

- 3152 OLANO (A), CORZO (N) and CASTRO (IM). Changes in anomeric composition of different crystalline forms of lactose during thermal treatment. *Food Chem.* 14(1); 1984; 53-63

The effect of heat on lactose crystals is investigated at different temperature and humidities. Changes may be explained in terms of dissolution, after loss of water of crystallisation, and mutarotational equilibria. AA

- 3153 BEUTLER (H-O) and SCHUTTE (I). An enzymatic method to determine sulphite in foodstuffs. *Dtsch. Lebensmittel Rundschau.* 79(10); 1983; 323-30 (German)

Sulphite oxidase (EC 1.8.3.1.) isolated from chicken liver was used to oxidize sulphite to sulphate and thereby liberate hydrogen peroxide. The latter was converted by reduced nicotinate-adenine-dinucleotide (NADH), in the presence of microbial NADH-peroxidase (EC 1.11.1.1). The decrease in NADH concentration - which is proportional to the sulphite concentration - was then measured photometrically. The precision of the measurements was very near the upper limit of the medium range (13-205 μmol sulphite 1 litre of test solution), and the coefficient of variation was 0.67%, in a solution of 67 μmol SO_2 /l. KMD

- 3154 FARRELL (FJ). HPLC in the analytical service laboratory. *Food Technol.* 38(4); 1984; 81-3

Covers the advantages of HPLC and its application in the analysis of amino acids, vitamins, sugars, flavours and antioxidants as also acids produced by microbiological activity. JVS

- 3155 LEGO (MC). HPLC in the flavour/spice industry. *Food Technol.* 38(4); 1984; 84-7

The nondestructive property of HPLC is invaluable in the isolation of flavour principles in sufficient quantities to permit identification of structure, sensory evaluation and product formulation. JVS

- 3156 JOURDAN (PS), WEILER (EW) and MANSELL (RL). Radioimmunoassay for naringin and related flavanone 7-Neohesperidosides using a tritiated tracer. *J. Agric. Food Chem.* 31(6); 1983; 1249-55

FOOD LAWS AND REGULATIONS

Nil

FOOD MICROBIOLOGY

ENZYMES

- 3157 BEEBY (R). Immobilized enzyme systems. *CSIRO Food Res. Q.* 43(4); 1983; 90-95

Use of immobilised enzymes in commercial applications; methods of immobilisation and possible future applications have been covered. Also includes analytical applications. KAR

- 3158 LOBARZEWSKI (J) and PASZCZYNSKI (A). Catalytic properties of immobilized crude and pure glycoamylase from *Aspergillus niger* C. *Biotechnol. Bioeng.* 25(12); 1983; 3207-12
- 3159 DONGOWSKI (D), ANGER (H) and BOCK (W). The effects of molecular parameters of the galacturonan substrate on the activity and the action of polygalacturonases from *Aspergillus* sp. *Nahrung.* 27(9); 1983; 817-30 (German)
- 3160 SREENATH (HK) and JOSEPH (R). Cultivation of streptomyces cultures on agricultural byproducts by surface (koji) method for production of xylanases. *Chem. Mikrobiol. Technol. Lebensmittel.* 8(2); 1983; 46-51

Streptomyces cultures are rather difficult to cultivate on solid substrates in the manner fungal cultures are grown. This is because of the presence of acid components in the solid substrates which are derived from plant sources (e.g. wheat bran). Buffering salts were employed to maintain pH 7.0 to facilitate growth of streptomyces cultures. Among various agricultural byproducts tested, wheat bran, red gram husk, paddy husk and coconut fibre supported good growth of various streptomyces cultures and facilitated production of high titres of xylanase. Surface cultivation gave better yields of enzyme compared with the submerged method of cultivation. Some of the cultivation conditions were standardized for surface method of xylanase production. AA

FERMENTATION

- 3161 PYM (DP). Aseptic fermentation design. *Food Microbiol.* 1(2); 1984; 129-40

A review on techniques for aseptic design covering sterilization by heat and by filtration, design of equipment including vessels, instrumentation, piping and valves and aseptic discharge of gases and fermenter culture. AA

- 3162 INGLEDEW (WM). Advances in the technology of ethanol production by fermentation. *MBAA Techn. Q.* 20(4); 1983; 131-7

Discusses: biotechnological possibilities; fermentation advances; and new microbes. BSN

FERMENTED FOOD

- 3163 HESSELTINE (CW). The future of fermented foods. *Nutr. Rev.* 41(10); 1983; 293-301

Discusses: advantages of food fermentation; adverse factors in using fermented foods; nutritional and economic data on some fermented foods; future changes in fermented foods; and factors aiding use of fermented foods. BSN

RICE MISO

- 3164 OHNISHI (K). Effect of ethanol on the changes of lipids during miso fermentation. *J. Jpn. Soc. Food Sci. Technol.* 30(2); 1983; 88-93 (Japanese)

The effects of ethanol on the degradation of glycerides and the ethyl esterification of fatty acids in *miso* during fermentation were investigated by addition of ethanol to *miso*. Lipase activity in *miso*, which played the most important role in the changes of lipids resulting in the formation of free fatty acid and ethyl fatty acids, was hardly concerned in the ethyl esterification ratio (the ratio of ethyl fatty acids to all the hydrolyzed fatty acids from glycerides). The ratio was affected definitely by the amount of ethanol in *miso*. The correlation between ethanol content (x mg/100g - *miso*) and the ratio (y%) could be expressed throughout the fermentation period as $Y = 2.679 x^{0.5} - 2.070$ ($r = 0.986$). The degradation ratio (the ratio of degraded fatty acids to total lipids in *miso*) was high under the condition of high lipase activity or long term fermentation. When the condition of lipase activity and the fermentation period were same, the ratio was affected by the amount of ethanol in *miso*. Accordingly, the action of yeast during *miso* fermentation was considered to contribute not only to the aroma formation by production of flavour substances but also to the changes of lipids in *miso* supplying ethanol as the result of fermentation. AA

- 3165 KATO (M), KIUCHI (K), MORI (Y), Tabei (H) and TAKAMI (I). Carboxylic acids contents and composition in salty rice *miso*. *J. Jpn. Soc. Food Sci. Technol.* 30(2); 1983; 99-107 (Japanese)

- 3166 ITO (K). Immunobiochemical studies on the soluble proteins of rice *miso*. (Kome *miso*). *J. Jpn. Soc. Food Sci. Technol.* 30(1); 1983; 38-42 (Japanese)

It was reported in a previous paper, that the soluble proteins of soya-bean *miso* (mame *miso*) were derived from soyabean *koji*. In the present paper, the relation of soluble proteins between rice *miso* and rice *koji* was immunobiochemically studied. Five protein components were detected in the soluble protein fraction of rice *miso* and found to be the antigens common with the soluble proteins of rice *koji* and it was also found by the use of rice *koji* anti-serum that seven protein components were the common antigens between rice *koji* and soyabean *koji* at the beginning of fermentation. AA

- 3167 ITO (K). Immunobiochemical studies on the soluble proteins of rice *miso* during maturing process. *J. Jpn. Soc. Food Sci. Technol.* 30(1); 1983; 43-7 (Japanese)

It was reported in a previous paper, that the soluble protein components of rice *miso* were derived from rice *koji*. In the present paper, the change of proteins during maturing process of *miso* and their enzymatic activities were investigated. The results obtained are as follows: (1) Five soluble protein components of rice *miso* were found to be the antigens common with the proteins of spores of rice *koji* starter by investigating the sequence of protein fraction in the maturing process of *miso*, (2) an acid sugar-protein of rice *miso* having an estimated molecular weight of 53 000 daltons showed an amyloclastic activity almost up to end of maturing and (3) an acid sugar-protein of *miso* having an estimated molecular weight of 25 100 daltons showed a proteolytic activity. AA

TEMPEH

- 3168 SHARMA (R) and SARBHOY (AK). *Tempeh* - a fermented food from soyabean. *Curr. Sci.* 53(6); 1984; 325-6

Four Indian soyabean varieties (DS-74-24-2, Bragg, Clark (yellow-seeded) and Jawa-16 (black-seeded) were used to make *tempeh* in the laboratory employing *Rhizopus stolonifer*, *R. arrhizus*, *R. oryzae*, *R. microsporus*,

R. oligosporus and *R. chinensis* for fermentation. The best results were obtained by *R. oligosporus* which not only gave good flavour and colour, but also formed a compact mass which was covered, with a white mouldy mass. This was followed by *R. stolonifer*, *R. oryzae*, *R. microsporus*, *R. arrhizus* and *R. chinensis*. All the three yellow seeded variety of soya-bean gave satisfactory *tempeh*; the black-seeded variety did not yield. Efforts were also made to extend the shelf-life of *tempeh*. The ammoniacal smell acquired due to excessive mould growth could be controlled by boiling *tempeh* in 10% brine. These slices are then dried, wrapped in polythene and stored in deep freeze for 10 days without any deterioration. MVG

- 3169 DJURTOFT (R) and NIELSEN (JP). Increase in some B vitamins, including B₁₂, during fermentation of *tempeh*, produced from cowpeas or soyabeans. *J. Plant Foods*. 5(3); 1983; 135-41

Significant increases in vitamin B₂ (riboflavin), B₆ (pyridoxine), B₁₂ (cynocobalamin), niacin and pantothenic acid contents were observed during fermentation of *tempeh* prepared from cowpea and soyabean. BSN

TOFU

- 3170 YASUDA (M), UECHI (G), and MIYAZATO (K). Production of Koji with *Monascus* sp. for Tofuyo-manufacturing. *J. Jpn. Soc. Food Sci. Technol.* 30(2); 1983; 63-7 (Japanese)

Beni-Koji prepared by growing *Monascus* on steamed rice is an important material for TOFUYO processing (red soyabean cheese). Two kilograms of steamed rice inoculated with 120 grams of seed-*koji* (ground in water) was wrapped in a cloth and was incubated at 32 C. After 38 hours of inoculation, the temperature of the materials was controlled by proper mixing. When the level of moisture was reduced to 30% or less, the *koji* materials were moistened by water-spraying. By these treatments, the growth of the microorganisms and the formation of the *koji*-pigment enhanced markedly. Optimum incubation period of the *koji* making was 150 hours after inoculation of the seed. The highest production of enzyme activities and pigment of the *koji* was obtained by employing autoclaved nonglutinous rice. The enzyme activities and the amount of pigment of the *koji* were not affected by a storage condition, at -20 C for 12 months. α -Amylase and saccharifying amylase of the *koji* were alcohol-tolerant, while it was not the case with protease. AA

LACTOBACILLUS

- 3171 BLICKSTAD (E). Growth and end product formation of two psychrotrophic *Lactobacillus* spp. and *Brochothrix thermosphacta* ATCC 11509^T at different pH values and temperatures. *Appl. Environ. Microbiol.* 46(6); 1983; 1345-50

MUSHROOM

- 3172 CHAUHAN (YS) and TOTH (B). Synthesis of N²-(γ -L-(+)-glutamyl)-4-carboxy-phenylhydrazine, a postulated precursor of agaritine of *Agaricus bisporus*. *J. Agric. Food Chem.* 32(3); 1984; 676-8

- 3173 BISARIA (R) and MADAN (M). Lignin degradation by an edible mushroom, *Pleurotus sajor-caju*. *Curr. Sci.* 53(6); 1984; 322-3

Lignin degradation by *P. sajor-caju* was identified by oxidase test on agar plates by using a small piece of mycelial growth from a malt agar slant.

Packed rice straw beds (400 g) were inoculated with wheat spawn. *P. sajor-caju* and the solid state cultivation of the mushroom was carried out under non-sterile conditions at 15-25 C at RH 90-95% for 40 days; an average of 496 of fresh fruit bodies were harvested during the period. The spent rice straw showed 47% loss of lignin. The spent residues, could be used as animal feed than untreated residues. MVG

YEAST

- 3174 FURUSAKI (S), SEKI (M) and FUKUMURA (K). Reaction characteristics of an immobilised yeast producing ethanol. *Biotechnol. Bioeng.* 25(12); 1983; 2921-8
- 3175 GADJEVA (D), MITEVA (E), NESTOROV (N) and RADEVA (M). The influence of yeasts *Candida utilis* on the carbonyl compounds, isolated from two "Lukanka" type raw-dried sausage products. *Nahrung.* 27(9); 1983; 831-6 (German)
- The influence of yeasts, *C. utilis*, producing lipolytic enzymes on the dynamics of total carbonyls, monocarbonyls, methyl-ketones, alkanals, 2-enals, and 2,4-dienals was investigated in two raw-dried sausage products. Carbonyl compounds were isolated from the products as 2,4-DN, which were separated into classes using column chromatography. The quantity evaluation was determined through the absorption in the UV region. The maximum growth of the yeasts led to formation of greater quantities of total carbonyls, monocarbonyls, and their subfractions. The accumulation of the greater amounts of saturated and unsaturated aldehydes improved the flavour and aroma quality of the products. AA

FOOD ADDITIVES

ANTIFUNGAL COMPOUND

- 3176 BHATTACHARYA (M) and MAJUMDAR (SK). Effect of some antifungal compounds on growth of *Penicillium citrinum* and citrinin production. *J. Food Sci. Technol.* (India) 21(1); 1984; 38-40
- The antifungal compounds with their concentration (g/100 g) tested on rice inoculated with *P. citrinum* are: sorbic acid 0.05-0.3, calcium propionate 0.05-0.4, sodium bisulphite 0.05-0.6, sodium sulphite 0.1-1.0, sodium benzoate 0.1-1.0, butyl paraben 0.05-0.3, propyl paraben 0.05-0.5 and methyl paraben 0.05-0.4. On the fifth and seventh day, citrinin production was assayed. Citrinin production on rice was inhibited by sodium sulphite and sodium benzoate at all levels; whereas sorbic acid and butyl paraben was needed at 0.2% level, and methyl paraben and calcium propionate at 0.3% and sodium bisulphite at 0.5% to inhibit citrinin production on rice by *P. citrinum*. KAR

ANTIOXIDANT

- 3177 DRAPER (HH) and BIRD (RP). Antioxidants and cancer. *J. Agric. Food Chem.* 32(3); 1984; 433-5
- High levels of BHT and BHA give protection against chemically induced neoplasia in animals by a phenomenon which involves the acceleration of catabolic process and excretion of carcinogens through a mixed oxidase

complex. Vitamins E and C are less active inhibitors of chemical carcinogenesis. They, however, check the formation of carcinogenic compound of oxidative rancidity in foods. JVS

BUTYLATED HYDROXYTOLUENE

- 3178 MAEURA (Y) and WILLIAMS (GM). Enhancing effect of butylated hydroxytoluene on the development of liver altered foci and neoplasms induced by N-2-fluorenylacetamide in rats. *Food Chem. Toxicol.* 22(3); 1984; 91-8

Feeding of BHT at 300, 1000 and 3000 ppm levels to rats previously fed N-2-fluorenylacetamide (0.2% for 8 weeks) did not exert significant effect either on foci development or on final yield of neoplasms. At a level of 6000 ppm, BHT increased foci, the area of gamma glutamyltranspeptidase-positive preneoplastic and neoplastic lesions and the incidence of neoplasm as 316 and 500 ppm levels of phenobarbital (PB). In comparison with PB, the BHT showed weaker liver carcinogenesis enhancing effect. AA

FLAVOUR

- 3179 STOFBERG (J). Flavour-safety evaluation. *Food Eng. Int.* 8(10); 1983; 41-3

A quantitative approach to flavour-safety regulation has been attempted in this article. The consumption ratio and food predominance of flavouring substances has been discussed. BSN

BEET RED

- 3180 HENNING (W). On the detection and evaluation of beet red (Betanine) addition to foodstuffs. *Dtsch Lebensmittel-Rundschau.* 79(12); 1983; 407-10 (German)

Milk products, meat products, and other foodstuffs were coloured with beet juice or with the pigment betanine (EEC No.E 162), and evaluated in accordance with the new German regulations for food labelling. Addition of beet juice or betanine to meat products must be rejected on principle. The pigment has been extracted by a simple method, then concentrated and cleaned up on a RP C-18 phase, and analysed by TLC-using cellulose and silica sheets. The pigment could be estimated by this method in many different foods. KMD

SYNTHETIC COLOUR

- 3181 CARMICHAEL (AJ), MOSSOBA (MM), RIESZ (P) and ROSENTHAL (I). Synthetic food colour: photosensitized decarboxylation of peptides. *J. Agric. Food Chem.* 32(3); 1984; 689-90

SACCHARIN

- 3182 ARNOLD (DL), KREWSKI (D) and MUNRO (IC). Saccharin: A toxicological and historical perspective. *Toxicology.* 27(3,4); 1983; 179-256

Discusses: early history; chemistry and methods of synthesis; uses and consumption; toxicological studies; epidemiological studies and saccharin/nonartificial sweeteners. BSN

CEREALS

- 3183 WOOD (PJ), FULCHER (RG) and STONE (BA). Studies on the specificity of interaction of cereal cell wall components with Congo red and calcofluor. Specific detection and histochemistry of (1 $\rightarrow$ 3), (1 $\rightarrow$ 4), β -D-Glucan. *J. Cereal Sci.* 1(2); 1983; 95-110
- 3184 McMASTER (GJ) and BUSHUK (W). Protein-carbohydrate complexes in gluten: Fractionation and proximate composition. *J. Cereal Sci.* 1(3); 1983; 171-84
- 3185 ADEYEMI (IA) and MULLER (HG). Effect of disulphide-cleaving reagents in the Zeleny sedimentation test. *J. Cereal Sci.* 1(3); 1983; 215-20
 The importance of fibrillar protein interactions in the Zeleny sedimentation test was investigated by determining the effects of including disulphide-cleaving reagents in the test reagents. The sediment volume decreased with increasing concentration of the cleaving reagent. A breakdown of the floc structure that occurred on adding sodium sulphite resulted in flour particles being suspended in the supernatant. A reduction in the sediment volume was found to be consistent with a decrease in the percentage of fibrillar particles in floc. This underlines the importance of protein fibril interaction in the Zeleny test. AA
- 3186 FRITZ (W) and ENGST (R). Investigations on the formation and on the occurrence of cancerogenic hydrocarbons in cereals and possibilities to reduce their content. *Nahrung.* 27(9); 1983; 847-52 (German)
 According to the authors' investigations every inhabitant of the GDR takes between 0.2 and 1.0 mg benzopyrene per year by food consumption including amounts of 0.03 to 0.17 mg on account of cereals and mill products. For the contamination of cereals, the following sources are in consideration: environmental contamination on account of industry dust (distant from industry 0.1 to 0.6, near to industry 0.3 to 4.2 μ g BaP/kg), passing over from soil to plant (with model experiments with soils more than 10000 μ g BaP/kg up to 22.3 μ g BaP/kg dry matter) as well as technologically caused contamination for instance by direct fume-and-gas drying (with the use of raw lignite up to 10 μ g BaP/kg). As it can be concluded from model experiments, BaP passes to flour at milling in dependence of the extraction rate. By separating the husks prior to milling, more than 50% of BaP can be removed from the stock. AA
- 3187 HOPPNER (K) and LAMPI (B). The biotin content of breakfast cereals. *Nutr. Rep. Int.* 28(4); 1983; 793-8
 Biotin was determined microbiologically, using *Lactobacillus plantarum* ATCC B 014 in 76 breakfast cereals. The main biotin content ranged from 1.3 to 31.6 μ g/100 g of product. Oatmeal, rolled oats, wheat bran and germ products contained the highest biotin levels. KAR
- 3188 WALKER (PT). The assessment of crop losses in cereals. *Insect. Sci. Applic.* 4(1/2); 1983; 97-104

WHEAT

- 3189 GARG (N), SINGH (R) and BATRA (VIP). Enzymes of glutamine and asparagine metabolism in developing wheat grains. *J. Agric. Food Chem.* 32(3); 1984; 519-23

The activities of glutamate dehydrogenase, aspartate pyruvate, transaminase, glutamate synthetase, glutamate-pyruvate transaminase, asparagine synthetase and glutamate-oxaloacetate transaminase in different stages of wheat grain development have been studied and discussed. JVS

- 3190 YOUNG (JC), FULCHER (RG), HAYHOE (JH), SCOTT (PM) and DEXTER (JE). Effect of milling and baking on deoxynivalenol (vomitoxin) content of Eastern Canadian wheats. *J. Agric. Food Chem.* 32(3); 1984; 659-64
Deoxynivalenol (DON) is a metabolite of *Fusarium graminearum* growing on cereal grains and belongs to the trichothecene family of mycotoxins implicated in human/animal diseases. Milling of wheat and baking showed 60 $\pm$ 20% reduction in DON. Milling only, lead to a fractionation of DON and ergosterol with higher levels in bran and lower levels in inner flour portions. DON production in Canadian wheat was directly related to fungal growth. JVS
- 3191 SCHOFIELD (JD), BOTTOMLEY (RC), TIMMS (MF) and BOOTH (MR). The effect of heat on wheat gluten and the involvement of sulphhydryl-disulphide interchange reactions. *J. Cereal Sci.* 1(4); 1983; 241-53
- 3192 MOSS (HJ), RANDALL (PJ) and WRIGLEY (CW). Alteration to grain, flour and dough quality in three wheat types with variation in soil sulphur supply. *J. Cereal Sci.* 1(4); 1983; 255-64
- 3193 ELIASSON (A-C). Differential scanning calorimetry studies on wheat starch-gluten mixtures. I. Effect of gluten on the gelatinization of wheat starch. *J. Cereal Sci.* 1(3); 1983; 199-205
- 3194 ELIASSON (A-C). Differential scanning calorimetry studies on wheat starch-gluten mixtures. II. Effect of gluten and sodium stearyl lactylate on starch crystallization during ageing of wheat starch gels. *J. Cereal Sci.* 1(3); 1983; 207-13
- 3195 GODON (B), LEBLANC (MP) and POPINEAU (Y). A small scale device for wheat gluten separation. *Qualitas plantarum.* 33(2-3); 1983; 161-8
A new small scale device for wheat gluten separation is described and the results of the first experiments on the influence of extraction conditions on different flours are reported. AA
- 3196 BRANLARD (G) and BELLOT (P). Improvement of bread wheat gluten quality. *Qualitas Plantarum.* 33(2-3); 1983; 121-6
61 cultivars of wheat obtained from 14 countries were grown at wheat laboratory, NRA station, clermout-Fernard in 1980. Studies on such wheat cultivars were conducted in order to determine the groups of gliadins and glutenin bands positively (or negatively) correlated with the values of the technological tests for measuring baking strength. BSN
- 3197 GRIDER (J), DAVIS (EA) and GORDON (J). Evaluation of selected properties of chlorinated wheat flours in a lean cake formulation. *Food Microstructure.* 2(2); 1983; 153-60
- 3198 BIETZ (JA), BURNOUF (T), COBB (LA) and WALL (JS). Gliadin analysis by reversed-phase high-performance liquid chromatography: Optimization of extraction conditions. *Cereal Chem.* 61(2); 1984; 124-9
Optimal extraction condition for reversed phase HPLC for gliadin analysis was achieved by using nondefatted flour, a 30 minute extraction time, and absence of prior extraction with NaCl. The most suitable extractants

were aqueous 70% ethanol or 55% 2-propanol. Aluminium lactate buffer (pH 3.1), 2 M urea and 2 M dimethyl formamide extracted in addition to gliadin, more albumin, globulin and glutenin, thereby resulting in more complex proteins. With minimum time and effort, the recommended HPLC conditions gave highly significant chromatograms. BSN

- 3199 STOREY (CL), SAUER (DB) and WALKER (D). Insect populations in wheat, corn, and oats stored on the farm. *J. Econ. Entomol.* 76(6); 1983; 1323-30

One or more live, stored-product insect species were found in 25.1% of the wheat, 56.4% of the oats, and 79.7% of the corn samples obtained from over 8,000 farm storages across 27 states. The average number of insects per 1,000 g in the infested samples was 26 for corn, 39 for oats, and 105 for wheat. Insects of the genus *Cryptolestes* were the predominant pests in wheat and corn, and *Oryzaephilus surinamensis* (L.) was the principal insect in oats. *Rhyzopertha dominica* (F.) was found throughout much of the grain-producing areas, including the northern states, but *Sitotroga cerealella* (Olivier) was only rarely detected in farm-stored grain. *Plodia interpunctella* (Hubner) occurred in 27.6% of the corn, but was only an infrequent pest in wheat and was not detected in oats. Insect species that prefer high moisture or feed on molds were found in 28.8% of the corn samples. The incidence of insects generally increased with increased grain moisture, and average test weights per bushel were lower in infested grain than in uninfested grain. The incidence of insects and the composition of insect populations within each commodity did not vary significantly with the length of time the grain had been in storage. AA

- 3200 VIATOR (HP), PANTOJA (A) and SMITH (CM). Damage to wheat seed quality and yield by the rice stink bug and southern green stink bug (Hemiptera: Pentatomidae). *J. Econ. Entomol.* 76(6); 1983; 1410-3

- 3201 GILBY (AR). Movement of halogenated fumigants through wheat. *J. Stored Prod. Res.* 19(4); 1983; 199-202

The movement of fumigants was studied by gas chromatography on columns of wheat coupled directly to a detector. The fumigants were methyl bromide, methylene dichloride, carbon tetrachloride, chloropicrin and ethylene dibromide. Their chromatographic behaviour was the same with carbon dioxide as carrier gas as with air or nitrogen. Improved distribution of fumigants added with carbon dioxide in silos is attributed to other factors and not to changes in the dynamics of adsorption of fumigant to wheat. AA

- 3202 MADRID (FJ), WHITE (NDG) and SINHA (RN). Effects of malathion dust on Indian meal moth and almond moth (Lepidoptera: Phycitidae) infestation of stored wheat. *J. Econ. Entomol.* 76(6); 1983; 1401-4

Glass bottles containing 100 g of wheat which was insecticide free or was treated with malathion (formulated as a dust) at 1, 2, or 8 ppm were infested with 20 eggs of *Plodia interpunctella* or *Ephestia cautella*. After 2 weeks of storage at 27 C, an additional 20 moth eggs were introduced into the bottles of wheat treated with malathion at 2 and 8 ppm. Since the original young larvae were killed. Insect numbers and grain quality were determined at 2, 4, 6, and 8 weeks in storage. Both *P. interpunctella* and *E. cautella* developed and multiplied in the insecticide-free wheat. The initial dose of malathion at 1 ppm effectively controlled *P. interpunctella*; no larvae developed into adults. A few *E. cautella* survived, and a mean of 1 adult per bottle was observed at 8 weeks of storage. Since insecticide degradation had occurred, Both species of moths developed successfully when wheat which initially contained malathion at 2 ppm was reinfested after 2 weeks of storage. However, larval mortality of both species was high. For both species

none of the original larvae or those developing from eggs added after 2 weeks survived with malathion at 8 ppm. A 1-ppm dose of malathion dust controlled *P. interpunctella* larvae, but levels above 2 ppm were needed to control *E. cautella*. The moisture content of the grain, which fluctuated between 15 and 18%, was not affected by the insect populations. Seed damage caused by insect feeding, seed germination, and seed-borne microflora was largely related to insect numbers in the various treatments. AA

RICE

- 3203 COGBURN (RR), CALDERWOOD (DL), WEBB (BD) and MARCHETTI (MA). Protecting rough rice stored in metal farm bins from insect attack. *J. Econ. Entomol.* 76(6); 1983; 1377-83

U.S. No. 1 grade rough rice was stored in galvanized metal bins and monitored for 12 months to determine insect infestation and quality factors. Six treatments - malathion, aeration, a combination of malathion and aeration, pirimiphos methyl, chlorpyrifos methyl, and controls - were tested. After 6-months storage, dichlorvos strips were compared to phosphine fumigation for moth control in selected bins. Heavy infestations of Angoumois grain moths, *Sitotroga cerealella* (Olivier) (Lepidoptera: Gelechiidae) and lesser grain borers, *Rhyzopertha dominica* (F.) (Coleoptera: Bostrichidae) developed in all untreated rice and in all rice treated with malathion. One replicate treated with pirimiphos methyl became infested with lesser grain borers. Two replicates treated with pirimiphos methyl and all replicates treated with chlorpyrifos methyl remained free from infestation for 12 months. Fumigation with phosphine reduced an infestation of Angoumois grain moths ca. 99% but the population began to recover immediately after treatment. A dichlorvos strip suspended in the overspace reduced the infestation by about 99% within six weeks and eliminated it by 12 weeks. Infestations that were not controlled resulted in severe quality damage. In some cases, the rice quality was reduced to U.S. sample grade in 12 months. AA

MILLETS

BARLEY

- 3204 GOTHARD (PG). Effect of storage time on the malting quality of some barley varieties. *J. Inst. Brew.* 90(1); 1984; 40-43

Changes in the malting quality of some barley varieties were monitored at monthly intervals from harvest. All the varieties were found to improve after storage for up to one year. Varieties with poorer malting grades improved at a faster rate than good varieties, although ranking consistent with malting grade was maintained. AA

- 3205 MARKOVIC (I), TOPOLOVEC (V), MARIC (V) and JOHANIDES (V). The barley protein degradation: Effect of neutral proteinase concentration on protein degradation kinetics. *J. Inst. Brew.* 90(1); 1984; 7-12

- 3206 SMITH (DB) and SIMPSON (PA). Relationships of barley proteins soluble in sodium dodecyl sulphate to malting quality and varietal identification. *J. Cereal Sci.* 1(3); 1983; 185-97

- 3207 SMITH (DB) and LISTER (PR): Gel-forming proteins in barley grain and their relationships with malting quality. *J. Cereal Sci.* 1(4); 1983; 229-39
- 3208 LINKO (P), HAKULIN (S) and LINKO (Y-Y). Extrusion cooking of barley starch for the production of glucose syrup and ethanol. *J. Cereal Sci.* 1(4); 1983; 275-84

Barley starch was liquefied at 105-106 C mass temperature, 40-65% water content, by *Bacillus licheniformis* α -amylase (Termamyl) in a Creusot-loire BC 45 twin-screw high temperature-short time (HTST) extrusion cooker. The subsequent saccharification was carried out normally in a batch process with *Aspergillus niger* glucoamylase (0.18-1.2%, w/w, d.m.) at 60 C, after dilution to 10-45% dry matter. The highest dextrose equivalent (DE)-94-95 (up to 97 in the supernatant) after 24 hour saccharification of 30% (d.m.) extrudate - was obtained after starch was extrusion-liquefied at 125-135 C, 60% water, 12 kg/h feed (d.m.), and 150 r/min. When starch was saccharified semi-continuously immediately after extrusion by recycling the extrudate through a Contherm Scraped-surface heat exchanger, a DE of 86-89 was attained in less than 4 hours. The maximum ethanol production in 44 hours from 22.5% (w/w, d.m.) syrup was obtained by a batch fermentation process with a syrup having low initial DE of about 58. About 95% conversion was achieved compared with about 79% conversion with a DE of about 81 and less than 76% with a DE about 97. AA

- 3209 HILL (RA), LACEY (J) and REYNOLDS (PJ). Storage of barley grain in iron age type underground pits. *J. Stored Prod. Res.* 19(4); 1983; 163-71

Factors affecting the storage of barley grain cv. Julia were studied during four seasons in underground pits constructed on Butster Ancient Farm Hampshire. Grain stored well overwinter except when the rainfall during the storage period was sufficient to increase grain water content greatly. In the wet seasons, the outermost grain in some pits showed more than 50% water content, spontaneous heating occurred and carbon dioxide concentration exceeded 30%. Otherwise most grain remained drier than 35% water content, temperatures remained less than 13 C and carbon dioxide concentrations were less than 25%. In good seasons, at least 90% of the grain germinated following storage but in bad, less than 5% germinated from some pits. Grain was stored successfully in pits of different shapes and sizes, but beehive-shaped pits were less wasteful of grain than cylindrical pits. Most important was an efficient top seal to prevent entry of rain and to retain carbon dioxide. While siting the pit within a round house ensured successful grain storage in all seasons. *Penicillium* species and members of the *Aspergillus glaucus* group were the predominant fungi isolated, supplemented by other species in the damper, outermost grain and in the pit structure. It was concluded that estimates of the population of Iron Age settlements based on pit numbers and size are unreliable. AA

- 3210 HALD (B), CHRISTENSEN (DH) and KROGH (P). Natural occurrence of the mycotoxin viomellein in barley and the associated quinone-producing penicillia. *Appl. Environ. Microbiol.* 46(6); 1983; 1311-7

- 3211 DAMOGLU (AP), DOWNEY (GA) and SHANNON (W). The production of ochratoxin A and citrinin in barley. *J. Sci. Food Agric.* 35(4); 1984; 395-400

The production of ochratoxin-A by *Aspergillus ochraceus* and of citrinin by *Penicillium viridicatum* grown on presterilized barley for 200 days at different temperatures, namely, 5, 10 and 20 C and a water activity of 0.85 has been reported. At 20 C the *A. ochraceus* multiplied rapidly and produced ochratoxin after 19 days; the toxin slowly disappeared over the 150 days. At 20 C, both ochratoxin A and citrinin were produced by *P. viridicatum*. JVS

MAIZE

- 3212 RICCARDI (A) and CERLETTI (P). Functionality of protein from corn germ and lupine seed. *Qualitas plantarum*. 33(2-3); 1983; 209-14

Some aspects of the functional behaviour with water were studied for a protein concentrate from corn germ, and, in lupine seed, for the proteins of the flour and for the purified globulins. The properties studied were solubility as a function of pH and of ionic strength, water adsorption and foaming behaviour. AA

- 3213 WILSON (CM). Isoelectric focusing of zein in agarose. *Cereal Chem.* 61(2); 1984; 198-200

SORGHUM

- 3214 HALLGREN (L) and MURTY (DS). A screening test for grain hardness in sorghum employing density grading in sodium nitrate solution. *J. Cereal Sci.* 1(4); 1983; 265-74

An indirect, non-destructive, inexpensive and simple method for testing hardness of sorghum grain was developed using density grading in sodium nitrate solution with a density of 1.315 g/ml at 25 C. The percentage of floating kernels was highly correlated with percentage vitreousness, the grain hardness determined as work required for grinding, flour particle size, and with rheological properties of a sorghum flour dough. AA

- 3215 ADEYEMI (IA). Dry-milling of sorghum for *ogi* manufacture. *J. Cereal Sci.* 1(3); 1983; 221-7

Ogi is a traditional porridge in Nigeria and is manufactured by wet-milling from either sorghum, maize or millet. This report describes attempts to produce dry-milled sorghum flour for *ogi* manufacture. The sorghum was dehulled, milled and sieved to obtain three flour fractions of different particle sizes. A further flour sample was obtained by dry-milling sorghum on a Buhler mill. The flours were steeped for 48 hours and the quality of the resultant *ogi* preparations was compared with that of *ogi* manufactured by the wet-milling process. With dry-milling the yield of *ogi* ranged from 12 to 90% depending upon the flour or sieved fraction used; the yield from the wet milling process was 60%. Titratable acidity was lower (0.5-0.6%) in all *ogi* samples prepared from dry-milled sorghum than in the *ogi* manufactured by wet-milling (0.7%). Protein, fat and crude fibre contents, and viscosity characteristics of flours and *ogi* preparations were assessed. Some advantages of dry-milling, as compared with wet-milling, in the manufacture of *ogi* are discussed. AA

PULSES

- 3216 SATHE (SK), DESHPANDE (SS) and SALUNKHE (DK). Dry beans of *Phaseolus*. A review. Part 1. Chemical composition: Proteins. *JRC Crit. Rev. Food Sci. Nutr.* 20(1); 1984; 1-46

Discusses: chemical composition; characteristics of proteins; recent advances in legume chemistry; isolation and fractionation; terms associated with protein functionality; functional properties and their important food applications; chemical and enzymatic modification for improved functionality and protein quality. BSN

PEA

- 3217 GUEGUEN (J) and LEFEBVRE (J). Water retention and flow behaviours of protein isolates from peas. *Qualitas Plantarum*. 33(2-3); 1983; 201-8

Protein isolates from pea flour were prepared by extraction of protein at pH 7.0 or 9.0 which was followed by precipitation as isoelectric isolates or as proteinates. After spray-drying, chemical composition, water retention capacities, thickening properties, and flow behaviours were determined and compared to those of a soyabean protein isolate (Supro 620). AA

AFRICAN LOCUST BEAN

- 3218 IKENEBOMEH (MJ) and KOK (R). Mass balance of the processing and fermentation of the African locust bean (*Parkia filicoidea* Welw.). *Can. Inst. Food Sci. Technol. J.* 17(1); 1984; 48-50

African locust beans (*Parkia filicoidea* Welw. seeds) were processed and fermented to the traditional West African condiment, *dawadawa*. *Dawadawa* is a good source of protein, fat and lysine. The beans were processed by boiling and dehulling to 'processed substrate' which was fermented at 37 C in static fermenter units. The mass balance during processing and fermentation was studied. It was found that 1.0 kg of raw beans (6.4% moisture by weight) yielded 1.3 kg of processed substrate (63% moisture by weight) which in turn was converted to 1.2 kg of *dawadawa* (65% moisture by weight). The loss of bean solids during processing was due to the removal of adhering pulp and testa as well as to solids extraction during boiling and washing. The loss of solids during fermentation was presumably due to microbial utilization of a fraction of the substrate. AA

BROAD BEAN

- 3219 SOBRINI (FJ), MARTINEZ (JA), ILUNDAIN (A) and LARRALDE (J). The effects of *Vicia faba*, polyphenols on absorption, growth and metabolism in the rat. *Qualitas Plantarum*. 33(2-3); 1983; 231-5

Two varieties of *Vicia faba* L. *equina* and *minor*, were studied. The *equina* variety had a higher polyphenolic content than the *minor* variety. Both varieties significantly inhibited rat growth rate and *in vivo* intestinal glucose transport, the *equina* variety being a more powerful inhibitor than the *minor* variety. However, the raw legume fed animals showed a normal urinary excretion rate of 3-methylhistidine. AA

- 3220 ANDERSSON (O) and SEHMANDKE (H). On the thermodynamic compatibility of *Vicia faba* protein with agar-agar in aqueous media. *Nahrung* 27(9); 1983; 84

Based on phenomenological studies the thermodynamic compatibility is described by a phase diagram. It shows the concentration conditions for mixtures of *Vicia faba* protein and agar-agar in aqueous media leading to single-phase systems in solution or gel. Complete compatibility was found for agar-agar concentrations $\geq 1.5\%$ and *Vicia faba* protein concentrations $\leq 1\%$. The same effect was observed for *Vicia faba* protein concentrations $\geq 1\%$ and agar-agar concentrations 0.4%. AA

COW PEA

- 3221 UKHUN (ME). Fatty acid composition and oxidation of cow pea (*Vigna unguiculata*) flour lipid. *Food Chem.* 14(1); 1984; 35-43

The lipids extracted from cowpea flour before and after store at water activities (a_w) of 0.11, 0.33 and 0.75 and at 5, 25 and 40 C for 6 months were examined for their fatty acid composition and oxidation. Linoleic, linolenic and oleic acids, in decreasing order, were the unsaturated fatty acids recorded. The saturated fatty acids were palmitic, stearic and arachidic in decreasing order. The total unsaturated fatty acids concentration was higher than the total saturated fatty acids, with palmitic acid being the single dominant fatty acid. Saturated/unsaturated fatty acid ratios (S/U ratio) and lipid conjugated diene absorbance at 233 nm indicated that the a_w of 0.33 and the storage temperature of 5 C were the most effective in mitigating the oxidation of the cowpea lipid. Oxidation rates of the unsaturated fatty acids were related to their levels of unsaturation. AA

FRENCH BEAN

- 3222 BLAGROVE (RJ), COLMAN (PM), LILLEY (GG), DONKELAAR (A) and SUZUKI (E). Physicochemical and structural studies on phaseolin from French bean seed. *Qualitas Plantarum.* 33(2-3); 1983; 227-9

LUPINE

- 3223 RESTANI (P), CERLETTI (P), SEMINO (G) and MARIANI (A). Nutritional value of proteins from lupine seed: Factors hindering the attack by proteolytic enzymes. *Qualitas plantarum.* 33(2-3); 1983; 187-91
- 3224 DURANTI (M) and CERLETTI (P). Subunit composition of proteins from seeds of *Lupinus albus*. *Qualitas plantarum.* 33(2-3); 1983; 135-8
- 3225 DURANTI (M), CUCCHETTI (E) and CERLETTI (P). Changes in composition and subunits in the storage proteins of germinating lupine seeds *J. Agric. Food Chem.* 32(3); 1984; 490-93
- 3226 BOUTHELIER (V), De CABANYES (J) and MUZQUIZ (M). Protein isolates and concentrates of *Lupinus* free from toxic substances. *Qualitas plantarum.* 33(2-3); 1983; 145-51

The presence of alkaloids in different species and varieties of lupine limit their use in the diet. Experiments have been carried out to obtain protein concentrates and isolates of two species of Lupins, *L. albus* and *L. mutabilis* and these have been compared with those carried out with soya. The results obtained indicated the importance of this flour, due to its high protein content in relation to the weight of the initial product used. In the protein isolates, with comparable yields of 29%, the protein levels were 90% for the soya and 96% for the *L. mutabilis*. For the concentrates (65% yield in soya to 72% in *L. albus*) protein percentages of 52% for the soya, 47% for *L. albus* and 67% for *L. mutabilis*, were obtained. AA

OILSEEDS AND NUTS

- 3227 DAVIN (A). Fractionation of oleaginous seed meals by screening and characterization of the products. *Qualitas Plantarum*. 33(2-3); 1983; 153-60

Bolting (size screening) separates different fractions from oleaginous seed meals with variations in composition as a function of particle size. Studies of the use of different types of milling before screening show that the impact mill and the millstone are best for rapeseed meal. The yield of isolate from different fractions of sunflower meal was also examined. Bolting can be done more easily with dehulled seed meals and can be extended to various other raw materials like cottonseed, soy, peanut, linseed and tomato seed. AA

MUSTARD

- 3228 MURTHY (NVKK) and NARASINGA RAO (MS). Interaction of phytate with mustard 12S protein. *J. Agric. Food Chem.* 32(3); 1984; 493-8

Binding of phytic acid with the mustard 12S protein was studied in the pH range 5.0-1.0 by the techniques of precipitation, turbidimetry, electrophoresis, and electrometric titration. The binding increased with decreasing pH. At pH 3.0, maximum binding of 170 mol of P/mol of protein was observed which agreed with the basic amino acid content of the protein. Only one class of binding sites was indicated. Electrophoretic studies indicated that even at pH 3.0 some amount of protein was still left in solution. Electrometric titration studies indicated the possibility of the presence of soluble protein-phytate complexes in the system. At pH 3.0, calcium inhibited the formation of protein-phytate complex. AA

RAPESEED

- 3229 DELISLE (J), AMIOT (J), BRISSON (G-J) and LACROIX (M). Improvement of rapeseed protein nutritional value. *Qualitas plantarum*. 33(2-3); 1983; 173-7

Although the efficiency ratio (PER) of vegetable proteins can be improved by supplementation with the limiting free amino acids, the digestibility of these proteins remains lower than that of animal proteins. The digestibility of a rapeseed protein concentrate measured in rats was improved from a value of 81 to 87% by water solubilization and ammonium sulphate precipitation. 2S and 12S fractions were also prepared from a rapeseed protein concentrate by a method based on differences of solubility in ammonium sulphate solutions. Protein digestibility of the rapeseed protein concentrate was found to be 82%, as compared to 87% and 89% for 2S and 12S fractions. A reduction of protein efficiency ratio was also recorded and was found to result from losses in amino acids. AA

- 3230 BEROT (S) and BRIFFAUD (J). Parameters for obtaining concentrates from rapeseed and sunflower meal. *Qualitas plantarum*. 33(2-3); 1983; 237-42

The use of various water-alcohol mixtures to remove antinutritional and technologically inconvenient factors from rapeseed and sunflower defatted meal is described. Meals obtained from dehulled seeds were repeatedly extracted with methanol, ethanol, propanol, isopropanol or isobutanol and water (50 or 60% V/V), at pH 6 at room temperature. Use of methanol, ethanol and isopropanol led to protein concentrates with very high nitrogen yields.

These products exhibited low residual contents of soluble carbohydrates, and polyphenols and, for rapeseed, glucosinolates. Moreover, they were bland flavoured and white coloured. AA

SOYABEAN

- 3231 KOUZEH-KANANI (M), VAN ZUILICHEM (DJ), ROOZEN (JP), PILNIK (W), VAN DELDEN (JR) and STOLP (W). Infrared processing of soyabeans. *Qualitas plantarum*. 33(2-3); 1983; 139-43

A procedure on laboratory and industrial scale is described for the production of full-fat soy flour of high nutritive quality and long shelf-life. The procedure involves infrared radiation of soyabeans followed by holding in an insulated bin. Production costs are reduced due to the use of relatively low temperatures, elimination of the preconditioning step, and elimination of drying after processing. A preliminary test is also reported using the flour in Dutch white bread. AA

- 3232 BINDER (R) and HADDON (WF). Cyclitols of soyabean leaves. *J. Agric. Food Chem.* 32(3); 1984; 685-7

- 3233 NAKAMURA (T), UTSUMI (S), KITAMURA (K), HARADA (K) and MORI (T). Cultivar differences in gelling characteristics of soyabean glycinin. *J. Agric. Food Chem.* 32(3); 1984; 647-51

The gelation and gel properties of glycinins were examined for 5 soyabean cultivars having different subunit compositions. The gelling characteristics of glycinin differed significantly among cultivars, arising from the differences in the nature of protein itself as well as protein concentration. Glycinins of three of the cultivars studied formed a gel within half the time required for the other two cultivars, where the former cultivars contained acidic subunit AS-IV, which is linked with a basic subunit to form an intermediary subunit through some bonds other than disulphide bonds, and the latter cultivars did not contain acidic subunit AS-IV. Hardness of the gels was different among cultivars, depending on the percentage of AS-III, which is the largest constituent acidic subunit of glycinin. Turbidity of the gels had a tendency to increase with increasing content of sulphhydryl groups of glycinins. AA

- 3234 PETENATE (AM) and GLATZ (CE). Isoelectric precipitation of soy protein: I. Factors affecting particle size distribution. *Biotechnol. Bioeng.* 25(12); 1983; 3049-58

The particle size distribution (PSD) of soyabean protein aggregates obtained by acid precipitation in a continuous stirred reactor was measured with a Coulter Counter model TA II. Effects of changes in the operating variables pH, concentration, mean residence time, power input, and ionic strength were investigated. Power input affects both growth and breakup, while pH and ionic strength seem to exert their influence through solubility and aggregate strength. Changes in ζ -potential can explain most of these observations. AA

- 3235 MOHRI (M) and MATSUSHITA (S). Improvement of water absorption of soyabean protein by treatment with bromelain. *J. Agric. Food Chem.* 32(3); 1984; 486-90

Acid precipitated soyabean protein (APSP) and 11S globulin heated for 100 C for 10 minutes and then treated with bromelain showed gradual increase in viscosity leading ultimately to coagulation. The coagula were soft gels

and floated in water. The molecular weight of degradation product of 11S globulin treated with bromelain was 15,000. The water absorption of APSP and 11S fraction was increased by enzyme treatment. JVS

- 3236 SEO (A) and MORR (CV). Improved high-performance liquid chromatographic analysis of phenolic acids and isoflavonoids from soyabean protein products. *J. Agric. Food Chem.* 32(3); 1984; 530-33

The improved HPLC method involves ethanol extraction of phenolics, mild hydrolysis of phenolic acid esters, separation of phenolic acids from isoflavonoids by C₁₈ Sep-PAK and reverse phase HPLC is of the 2 phases of the two fractions using a water-acetic acid and methanol-acetic acid treatment. JVS

- 3237 BROOKS (JR) and MORR (CV). Phosphorus and phytate content of soyabean protein components. *J. Agric. Food Chem.* 32(3); 1984; 672-4

The study indicated that most of phosphorus in 11S fraction was non-phytate. On the contrary, 7S fraction and soy whey precipitate contained the major portion of phytate. JVS

- 3238 FARMAKALIDIS (E) and MURPHY (PA). Oestrogenic response of the CD-1 mouse to the soyabean isoflavones genistein, genistin and daidzein *Food Chem. Toxicol.* 22(3); 1984; 237-9

The present study showed that CD-1 mouse does not respond to genistein and daidzein as also to diethylstilboestrol at levels known to be effective in other strains. JVS

- 3239 YAMANO (Y), UEDA (K) and MIKI (E). Effect of emulsifying condition on emulsification with soyabean lecithin. *J. Jpn. Soc. Food Sci. Technol.* 30(2); 1983; 73-8 (Japanese)

SUNFLOWER SEED

- 3240 ETIEVANT (PX), AZAR (M), PHAM-DELEGUE (MH) and MASSON (CJ). Isolation and identification of volatile constituents of sunflowers (*Helianthus annuus* L.) *J. Agric. Food Chem.* 32(3); 1984; 503-9

GC and MS analysis of extracts and polar fractions isolated by silica gel chromatography showed 84 components; of these, 20 terpene hydrocarbons, 9 alcohols, 3 phenols, 6 esters, and 19 oxygenated compounds were identified. JVS

- 3241 DAVIN (A), BEROT (S) and PETIT (L). Preparation of sunflower isolates at a pilot-plant scale. *Qualitas plantarum.* 33(2-3); 1983; 221-6

At a pilot-plant scale, various patented processes for preparation of sunflower isolates were examined. The objectives of these processes are to improve the quality of the isolates (particularly their protein content), to reduce their content of glucidic substances (which obstruct spinning) and to improve their colour. A correlation exists between these parameters and isolate yields. Our results, obtained with industrial meals, should be largely improved with respect to yield and colour with meals obtained from dehulled kernels which have not been subjected to as much heat-treatment as the industrial meals. AA

HAZELNUT

- 3242 MOHR (E), WICHMANN PENKALA (M) and WINOTO (S). Quantitative detection of hazelnut content in nut-nougat creams - simple radial immunochemistry. *Gordian*. 83(10); 1983; 193-9

As a first step, soluble hazelnut proteins have been extracted from hazelnut-containing products. Then, the hazelnut content of a nut-nougat cream was determined with an accuracy of $\pm 0.5\%$, using a simple radial immuno-chemical method developed by Mancini. Other proteins, like soy milk and whey proteins, do not interfere in this estimation. The protein loss suffered during the roasting of hazelnuts has been estimated at about 20%.
KMD

TUBERS AND VEGETABLES

CARROT

- 3243 SIMON (PW) and LINDSAY (RC). Effects of processing upon objective and sensory variables of carrots. *J. Am. Soc. Hortic. Sci.* 108(6); 1983; 928-31

Four hybrids of carrots were analysed raw, fresh-cooked, canned-cooked, or frozen cooked for sensory and objective parameters. Processing reduced the carotenoid and volatile terpenoid concentrations. Relative to raw carrots, sugar content was reduced in canned cooked and frozen cooked carrots, but increased in fresh cooked samples. Fresh cooked and frozen-cooked carrots exhibited a 10-fold reduction in shear pressure texture relative to raw texture. While canned carrots had 30-fold reduction. Harsh flavour was reduced greatly by canning and freezing, but was not reduced as much in fresh-cooked samples. KAR

RADISH

- 3244 KANEKO (K), KUROSAKA (M) and MAEDA (Y). Studies on the mechanisms of changes in contents of inorganic cations in crude cell wall preparation and of increase of hot water soluble pectin during salting of radish root. *J. Jpn. Soc. Food Sci. Technol.* 30(2); 1983; 94-8 (Japanese)
- 3245 KANEKO (K), KUROSAKA (M) and MAEDA (Y). Effect of Ca salt on pectic substance and crisp palatability of salted radish root. *J. Jpn. Soc. Food Sci. Technol.* 30(2); 1983; 111-3 (Japanese)

POTATO

- 3246 EVANS (D) and MONDY (NI). Effect of magnesium fertilization on glycoalkaloid formation in potato tubers. *J. Agric. Food Chem.* 32(3); 1984; 465-6
- 3247 MARKS (H) and HILL (MA). A comparison of the energy used during the cooking of potatoes by various methods. *J. Plant Foods.* 5(3); 1983; 149-59

SWEET POTATO

- 3248 BRADBURY (JH), BAINES (J), HAMMER (B), ANDERS (M) and MILLAR (JS). Analysis of sweet potato (*Ipomoea batatas*) from the highlands of Papua New Guinea: Relevance to the incidence of *Enteritis necroticans*. *J. Agric. Food Chem.* 32(3); 1984; 469-73

Enteritis necroticans (EN) is endemic to and is the major cause of death in children (of more than one year) from the highlands of Papua New Guinea. The EN is caused by *Clostridium botulinum* and is associated with protein deficient diets of which *Ipomoea batatas* (sweet potato) constitutes the staple food. Analysis of crude proteins amino acids and trypsin inhibitor content of 21 cultivars of sweet potato grown in two different areas characterised by low and high incidence of EN respectively. No significant differences were found in crude protein content, amino acid scores or trypsin inhibitor contents between sweet potatoes from different region. JVS

- 3249 CHUA (JW), FUKUI (N), WAKABAYASHI (Y), YOSHIDA (T) and TAGUCHI (H). Enzymatic hydrolysis of sweet potato for energy saving production of ethanol. *J. Ferment. Technol.* 62(2); 1984; 123-30

Enzymatic hydrolysis was carried out using pectin depolymerase and glucoamylase. In the hydrolysis system, when the mash was subjected to low temperature heating after inactivation with 0.1% pectin depolymerase, 12% ethanol was produced after 48 hour fermentation by employing 0.05% glucoamylase. In the hydrolysis system, without heating, hydrolysis reached less than 30% even with a glucoamylase concentration of 0-6%. KAR

CASSAVA

- 3250 McDOWELL (I) and ODURO (KA). Investigations of the β -carotene content of yellow varieties of cassava (*Manihot esculenta* Crantz). *J. Plant Foods.* 5(3); 1983; 169-71

Yellow varieties BB3 yellow gari from Ghana and yellow heart (small) and yellow heart (large) showed vitamin A content of 117, 483 and 1883 μ /100 g dry weight respectively, which are not as high as in carrot (10,000-26,000), sweet potato (upto 12,000), turnip (7,000-10,000) and yam (upto 2,500 μ /100 g). BSN

- 3251 EZEALA (DO). Changes in the nutritional quality of fermented cassava tuber meal. *J. Agric. Food Chem.* 32(3); 1984; 467-9

Fermented cassava tuber meal is used as a dietary source of energy in third world countries, especially W. Africa. Traditional fermentation of cassava decreased the protein, phosphorus, magnesium, potassium and sodium. It also accounted for some degree of reduction in chemical score of protein and in biological value. JVS

- 3252 DOIN (PA), OLIVO (JE), VARELLA (VL), CONCONE (BR) and PINTO (AG). The effects of the initial cell concentration on the alcoholic fermentation of cassava. *J. Ferment. Technol.* 62(2); 1984; 195-9

Using *Saccharomyces cerevisiae*, ethanol fermentation from cassava starch was carried out. Ethanol productivities and yields were not affected by the initial cell concentration unless and this was below 0.3 to 0.6 g/l (dry base). Average ethanol productivities of about 4.0%/hr were consistently obtained with ethanol yields ranging from 85 to 90%. KAR

AMARANTH

- 3253 LORENZ (K) and WRIGHT (B). Phytate and tannin content of amaranth. *Food Chem.* 14(1); 1984; 27-34

The phytate and tannin contents of eight varieties of amaranth were determined. The phytate content of amaranth (0.52-0.61%) was higher than that of rice and millet, but lower than that of corn and wheat. Phytate is distributed throughout kernels of amaranth. Phytate content cannot be reduced by removal of the seed coat. Tannin levels of amaranth (0.043-0.116% catechin equivalent) were small in comparison with those in sorghum and millet. Tannin levels in the seed coat of amaranth are higher than those in the starchy perisperm. AA

LUCERNE

- 3254 RAMBOURG (JC) and MONTIES (B). Determination of polyphenolic compounds in leaf protein concentrates of lucerne and their effect on the nutritional value. *Qualitas plantarum.* 33(2-3); 1983; 169-72

Leaf protein concentrates were prepared by heat coagulation of lucerne 'brown juice'. A fraction of the phenolics was completely extractable by organic solvents. Coumestrol (which occurs in lucerne leaf proteins) was estimated after progressive elution with solvents and fluorimetry in solution. Significant reductions of both coumestrol content and total flavonoides were observed after washing of the concentrates. AA

ARTIPEX HORTENSIS

- 3255 CARLSSON (R) and CLARKE (EMW). *Atriplex hortensis* L. as a leafy vegetable, and as a leaf protein concentrate plant. *Qualitas plantarum.* 33(2-3); 1983; 127-33

TOMATO

- 3256 HEIL (JR), LEONARD (S) and PATINO (H). Microbiological evaluation of commercial fluming of tomatoes. *Food Technol.* 38(4); 1984; 121-6

The last portions of water in the counter current system employed for washing tomatoes from bulk containers raised the microbial load particularly in broken fruits. In some cases the waste water showed lesser microbial load than the first trough of water. The higher microbial load in first trough water could be associated with the soil carried by the tomatoes, use of dewatering devices and disposal of soiled water from the truck should reduce contamination from bulk containers. JVS

- 3257 KAVANAGH (EE) and McGLASSON (WB). Determination of sensory quality in fresh market tomatoes. *CSIRO Food Res. Q.* 43(4); 1983; 81-9

Reducing sugars and acids contribute to the taste of the tomatoes. Although improvement in flavour can be achieved by breeding tomatoes with higher level of sugars and acids, it is not yet possible to measure the contribution of aroma compounds until this problem is solved, it will be necessary to use taste panels for the evaluation of new cultivars. KAR

COMFREY

- 3258 BRIGGS (DR), RYAN (KF) and BELL (HL). Vitamin B₁₂ activity in comfrey (*Symphytum* sp.) and comfrey products. *J. Plant Foods*. 5(3); 1983; 143-7
 Comfrey (*Symphytum* sp.) is a herb of the family Boraginaceae and is consumed as a salad vegetable, tea or tablet. Using *Lactobacillus leichmannii*. It was found that comfrey contained very low levels of vitamin B₁₂ activity. BSN

SOLANUM NIGRUM

- 3259 FAWUSI (MOA). Nitrogen fertilization and storage temperature effects on the nutritive value of *Solanum nigrum*. *J. Plant Foods*. 5(3); 1983; 161-7

FRUITS

BLACKBERRY

- 3260 YOON (K-R).and WROLSTAD (RE). Investigation of Marion blackberry, strawberry, and plum fruit for the presence of saponins. *J. Agric. Food Chem.* 32(3); 1984; 691-3
 Strong evidence (foam formation, haemolysis of erythrocytes, etc.) has been obtained to indicate the presence of saponins in blackberries. TLC indicated 4 saponins in blackberry juice. Strawberries contained compounds capable of producing stable foam but the presence of saponins was not substantiated by other tests. There was no evidence for the presence of saponins in plum fruit. JVS
- 3261 ARCHER (TE) and STOKES (JD). Residue analysis of glyphosate in blackberries by high-performance liquid chromatography and post-column reaction detection. *J. Agric. Food Chem.* 32(3); 1984; 586-8
 The method consists in the extraction of sample in acid medium, clean-up on an anion and cation resin column, analysis by HPLC and post column derivatisation with O-phthalaldehyde and a fluorescence detector at an excitation of wave length of 230 nm and with a 418 nm cut off filter for emission (sensitivity 0.05 ppm; mean recovery 85%). JVS

PASSION FRUIT

- 3262 ENGEL (K-H) and TRESSL (R). Differentiation of yellow and purple passion fruits by investigation of their ester composition. *Chem. Mikrobiol. Technol. Lebensmittel* 8(2); 1983; 33-9
 A qualitative and quantitative investigation of the ester composition in yellow and purple passion fruits has been carried out by means of standard-controlled distillation-extraction, liquid-solid chromatography, and capillary gas chromatography-mass spectrometry. Twenty-five esters, including those of secondary (pentanol-2, nonanol-2), unsaturated ((Z)-3-octenol, (Z)-3-decenol), and monoterpene alcohols (geraniol, citronellol) were identified for the first time as passion fruit constituents. Their importance to a differentiation of the varieties was demonstrated and possible biosynthetic pathways for the formation of these esters are discussed. AA

RASPBERRY

- 3263 POSTEL (W) and ADAM (L). Gas chromatographical characterization of raspberry brandy. *Dtsch. Lebensmittel-Rundschau*. 79(4); 1983; 117-22 (German)
- In 18 German and 7 French raspberry brandies 50 volatile components (10 carbonyl compounds, 16 alcohols, 7 terpenoids, 15 esters, 1 lactone, 1 sulphide) were determined by means of gas chromatography. Of the 29 compounds identified in fresh raspberries, 25 were also quantitatively detectable in raspberry brandies using a direct injection method. The raspberry brandies investigated differ considerably in their contents of volatile substances due to the properties of the alcohol used (neutral spirit or spirits from fruit sources), the amount of raspberries, and their quality (fresh, more or less fermented, or infected by bacteria). According to production regulations the contents of volatile compounds in French products are very much higher than in German ones. AA

STRAWBERRY

- 3264 WINTERLIN (WL), KILGORE (WW), MOURER (CR) and SCHOEN (SR). Worker re-entry studies for Captan applied to strawberries in California. *J. Agric. Food Chem.* 32(3); 1984; 664-72
- Captan was applied to strawberries and residues of its metabolite tetrahydrophthalimide (THPI) was determined. The urine of applicator/loader/mixer exposed to higher dermal levels of captan did not show THPI; the urine of pickers had detectable levels of THPI. JVS

KIWI FRUIT

- 3265 SIEBER (JN), McCHESNEY (MM), KON (R) and LEAVITT (RA). Analysis of glyphosate residues in Kiwi fruit and Asparagus using high-performance liquid chromatography of derivatized glyphosate as a cleanup step. *J. Agric. Food Chem.* 32(3); 1984; 678-81
- Glyphosate is a broad spectrum herbicide. In the present method, the material is extracted with a mixture of water and chloroform extract cleaned-up employing anion exchange chromatography, derived with trifluoroacetic anhydride followed by diazomethane, further cleaned-up by silica gel HPLC and appropriate portion determined by GLC using flame photometry (Recovery 87% from kiwi fruit fortified 0.1-0.25 ppm and 80% from Asparagus fortified at 0.05-0.1 ppm). JVS

CITRUS

- 3266 RIZZI (GP) and BOEING (SS). Mass spectral analysis of some naturally occurring polymethoxyflavones. *J. Agric. Food Chem.* 32(3); 1984; 551-5
- The preparation and mass spectral analysis of ten representative polymethoxyflavones several of which occur in citrus plants have been reported. JVS
- 3267 MOSHONAS (MG) and SHAW (PE). Direct gas chromatographic analysis of aqueous citrus and other fruit essences. *J. Agric. Food Chem.* 32(3); 1984; 526-30

A method has been developed to determine the flavour and aroma components of natural fruit essences by direct injection into GC. It was developed for citrus essences but can be used for essences from apples, grapes, pineapples, strawberries and bananas. JVS

- 3268 GAULLIARD (JM) and PELOSSIER (R). Al phosethyl effectiveness in soaking citrus fruits against *Phytophthora parasitica*, an agent of brown rot, and against *Penicillium digitatum*. *Fruits*. 38(10); 1983; 693-7 (French)
- Phosethyl Al (the active ingredient in the formulation ALIETTE P.M. 80-5%) enables one to combat brown rot effectively. The citrus fruits have to be immersed in a solution containing 3 g of the active ingredient per litre. This treatment also has a noticeable retarding action on green mould. KMD

MANGO

- 3269 ABOUL-ENEIN (AM), SALEM (HM) and ZAHARAN (MM). Effect of gamma irradiation on mango volatiles during ripening. *Chem. Mikrobiol. Technol. Lebensmittel*. 8(2); 1983; 60-63
- Mango fruits (variety *Ewaïs*) were irradiated at the mature green stage with gamma rays at doses of 0.25; 0.50; 1 and 2 KGy. At different periods of storage, the vapour over the homogenate was directly subjected to GLC analysis as a new technique to minimize the enzymatic activity and the formation of artificial compounds. GLC separation of mango volatiles revealed the occurrence of 20 compounds from which 16 compounds were identified. Most of these volatiles were lost during ripening (storage) and also by irradiation at higher doses (1 and 2 KGy). The study also showed that gamma rays at 0.25 KGy dose prevented the loss of some volatile compounds during storage such as *cis*-ocimene, myrecene and limonene which represented the main volatiles in mangoes. This dose delayed ripening in the fruits about 10 days when compared to unirradiated ones. AA

PRUNES

- 3270 BOLIN (HR), STAFFORD (AE) and FLATH (RA). Increased specificity in sorbic acid determination in stored dried prunes. *J. Agric. Food Chem.* 32(3); 1984; 683-5
- Two thermal degradation products, namely, 5-(hydroxymethyl)-2-furaldehyde and 2-opuraldehyde were isolated from processed prunes and identified by using GC-MS. JVS

OLIVE

- 3271 SCIANCALEPORE (V) and LONGONE (V). Researches on catechol oxidase from green olives. 2. Isoenzymes. *Ind. Aliment.* 22(9); 1983; 640-44 (Italian)
- 3272 SCIANCALEPORE (V) and LONGONE (V). Research on the catechol oxidase in green olives. 3. Electrophoretic analysis. *Ind. Aliment.* 22(10); 1983; 745-8 (Italian)
- Olive catechol oxidase of the 30-90% ammonium sulphate fraction was resolved into 8 active bands. Differences were observed in the iso-enzyme patterns of the two active fractions eluted from Sephadex G-100 column, but no differences were observed in the iso-enzyme patterns of the two active fractions eluted from the DEAE-Sephadex column. KMD

- 3273 TUTOUR (BL), TANTAOUI-ELARAKI (A) and ABOUSSALIM (A). Simultaneous thin layer chromatographic determination of aflatoxin B₁ and ochratoxin A in black olives. *J. Assoc. Off. Anal. Chem.* 67(3); 1984; 611-2

Both the mycotoxins are extracted with aqueous methanol, cleaned-up with lead acetate, defatted with hexane, partitioned in chloroform, and subjected to TLC (Detection limits, 5-7 mcg aflatoxin B₁ and 20 mcg ochratoxin per kg). JVS

- 3274 TANTAOUI-ELARAKI (A), TUTOUR (BL), BOUZID (M) and KEDDANI (J). Contamination of "Greek style" black olives by toxigenic *Aspergillus* spores and their toxins. *Ind. Aliment. Agric.* 100(12); 1983; 997-1000 (French)

One hundred and three samples of "Green style" black olives were tested for mycotoxins; 12 samples contained aflatoxins 40B₁ (5 to 37 µg/kg) and 5 contained ochratoxin A (40-80 µg/kg). *A. flavus* was isolated from 19 samples, and *A. ochraceus* from 4 samples, while both the species were simultaneously present in 2 samples. All the isolated strains were toxigenic in laboratory media. KMD

APPLE

- 3275 LAU (OL). Effects of storage procedures and low oxygen and carbon dioxide atmospheres on storage quality of 'Spartan' apples. *J. Am. Soc. Hortic. Sci.* 108(6); 1983; 953-7

'Spartan' apples (*Malus domestica* Borkh.) kept in 1.0% O₂ + 2.0% CO₂ at 0°C for 6-9 months were firmer and had more acids than apples kept at standard commercial atmospheres of 2.5% O₂ + 2.0% CO₂. The high firmness and juice acidity associated with low O₂ atmospheres persisted for 7 days in 20° air. Reduction of storage CO₂ from 2.0% to 0.5% appreciably decreased firmness and increased incidence of core browning and scald in fruit stored at 2.5% O₂ but not in those stored at 1.0% O₂. No fruit injury or increased alcohol or off-flavour production resulted from the low O₂ treatments; reduction of storage O₂ from 2.5% to 1.0% decreased core browning in the fruit. Fruit stored in 1.0% to 2.5% O₂ with a "rapid CA" procedure were firmer than those with a "slow CA" procedure immediately after removal from the storage, but this benefit disappeared in fruit from the 1.0% and 1.5% O₂ atmospheres after an additional storage period of 28 days in 0° air and 7 days in 20° air. AA

PAPAYA

- 3276 BIRTH (GS), DULL (GG), MAGEE (JB), CHAN (HT) and CAVALETTO (CG). An optical method for estimating papaya maturity. *J. Am. Soc. Hortic. Sci.* 109(1); 1984; 62-6

The tilting-filter spectrophotometer, used in conjunction with the body-transmittance geometry, can make the spectral measurements on papaya required to separate them into maturity categories ranging from immature to ripe. KAR

MELON

- 3277 KING (RD) and ONUORA (JO). Aspects of melon seed protein characteristics. *Food Chem.* 14(1); 1984; 65-77

Protein from Nigerian melon seed types (*Colocynthis citrullus*) was studied by electrophoresis, chromatography on Sephadex, sedimentation and

amino acid analysis. The major protein, a globulin was separated into three fractions by gel filtration and ultra-centrifugation and their molecular weight determined. The total salt-extractable protein was characterised by a low level of lysine, and relatively large amounts of glutamic acid, aspartic acid arginine. KAR

- 3278 ONUORA (JO) and KING (RD). Thermal transitions of melon seed proteins. *Food Chem.* 13(4); 1984; 309-16

At heating rate of 10 C/minute, the protein in the raw seed, oil meal and flour showed endothermic transitions with the maximum heat input occurring at 160, 89 and 93 C respectively; these transitions corresponded to the denaturation of the reserve globulin. The water soluble protein and the glutelin fractions did not show any observable change. pH and salts in the suspending medium affected its thermal stability. Aggregation of water soluble protein begun at 60 C and the globulin at 81 C. KAR

SUGAR, STARCH AND CONFECTIONERY

- 3279 ASENJO (JA). Maximizing the formation of glucose in the enzymatic hydrolysis of insoluble cellulose. *Biotechnol. Bioeng.* 25(12); 1983; 3185-90

- 3280 MBUGUA (SK), LEDFORD (RA) and STEINKRAUS (KH). Gas chromatographic determination of mono-, di-, and trisaccharides in the Uji-flour ingredients and during Uji fermentation. *Chem. Mikrobiol Technol. Lebensmittel.* 8(2); 1983; 40-45

Fermentable sugars in Uji flour ingredients (maize meal, finger millet sorghum and corn flour) and during fermentation were examined as trimethylsilyl (TMS) derivatives using an internally standardized gas chromatographic procedure. Columns packed with Gas Chrom A 100/120 mesh, loaded with OV 1 liquid phase were used. Microbial growth and acid formation were also examined. Total sugars in the flours ranged from 0.53-0.81%. Sucrose was the major sugar. The sugars formed the major carbon source for the fermenting organisms. Data on the hydrolytic activities on raffinose, sucrose and starch, and reduction of fructose during fermentation are presented and discussed. AA

- 3281 WALKER (CE). Food application of sucrose esters. *Cereal Food World.* 29(5); 1984; 286, 288-9

Chemical combination of sucrose and fats yields sucrose esters, Review provides glimpses of procedures used for their preparation and safety/metabolism applications of sucrose esters. JVS

- 3282 DREHER (ML), DREHER (CJ) and BERRY (JW). Starch digestibility of foods: A nutritional perspective. *CRC Crit. Rev. Food Sci. Nutr.* 20(1); 1984; 47-71

Discusses, process of starch digestion; digestibility of unmodified starches; digestibility of modified starches; alpha amylase inhibitors (starch blockers); and effect of starch digestibility on other nutrients. BSN

- 3283 ULIJASZEK (SJ). Palm sago (*Metroxylon* species) as a subsistence crop. *J. Plant Foods.* 5(3); 1983; 115-34

Discusses: distribution and history; taxonomy and biology; cultivation starch extraction; cooking; nutritional status; importance and research aspects still to be tackled. BSN

CONFECTIONERY

- 3284 MINSON (E). Confectionery coatings. *Cereal Food World*. 29(5); 1984; 283-5

Review: Definition of confectionery coatings, manufacturing steps (illustrated in a figure), selection of fats-lauric and non-lauric for confectionery coatings and their food applications. JVS

BAKERY PRODUCTS

- 3285 SPICHER (G). Report on the 34th Convention of Cereal Chemistry of the Cereal Research Work Group, held at Detmold on 17-19 May 1983. *Dtsch Lebensmittel-Rundschau*. 79(12); 1983; 410-13 (German)

Summaries of 15 papers presented at the Convention have been published here. HERTEL (W): Environmental protection and food production. ARNDT (WD): Measurement of water activity (a_w) and its practical application. SPICHER (G): Mould fungi flora of packed bread. WOLFF (J), OCKER (H-D) and ZWING-ELBERG (H): Determination of ergot alkaloids in cereals and milled products by HPLC. SCHIEBERLE (P) and GROSCH (W): Investigations on aroma substances of rye bread crust. BOLLING (H) and WEIPERT (D): Extensogramm for the evaluation of dough properties. SEIBEL (W): Enrichment of bread and small baked goods with various ballast materials. FELDHEIM (W) and WISKER (E): Influence of ballast materials from various breads, fruits and vegetables on the stool weight of young women. BECKER (H) and STELLER (W): Ballast material intake through bread in the Federal Republic of Germany. ABD-EL-KADAR (MA), MORAD (MM), EL-BADAWI (A), ASKARA (A) and OMRAN (HT): Nutritive value and baking behaviour of enriched wheat flours. MENDEN (E): Nutritional physiological evaluation of baked goods. TEGGE (G) and MAYER (H): Raw material for the chemical industry from cereals - Example "di-aldehyde starch". SPICHER (G) and NIERLE (W): Proteolytic activity during sour dough fermentation. NIERLE (W) and ELBAYA (AW): Lipoproteins in flour and dough. POMERANZ (Y), SEIBEL (W), BRUMMER (J-M) and STEPHAN (H): Baking-technological effect of oil and fat in the presence of emulsifiers in yeast-raised baked goods. KMD

BREAD

- 3286 ANON. "Our daily bread" in the light of recent knowledge. *Gordian*. 83(10); 1983; 200 (German)
- 3287 KLEMPF (J). Bread for nutrition-conscious consumers. *Gordian*. 83(10); 1983; 203 (German)
- 3288 HOSENEY (RC). Gas retention in bread doughs. *Cereal Food World*. 29(5); 1984; 305-8
- Review: Discusses the mechanism of and cause for retention of gas; gluten free-bread, role of lipids (liquid crystal phase in aqueous phase of bread) in gas retention, and loaf volume regulation by gluten components, namely, gliadin proteins. JVS
- 3289 RUSSELL (PL). A kinetic study of bread staling by differential scanning calorimetry and compressibility measurements. The effect of different grists. *J. Cereal Sci.* 1(4); 1983; 285-96

Differential scanning calorimetry (DSC) and crumb compressibility measurement have been used to study the effect of flour grist on the kinetics of bread staling. Flours were from (A) Canadian Western Red Springs (CWRS) wheat, (B) a blend of 100% English wheats and (C) a 1/1 (w/w) mixture of flours (A) and (B). The results from the DSC and crumb compressibility measurements were analysed by fitting an Avrami equation to each data set by computer using the method of non-linear least squares. All the data sets were also analysed together employing several different models, in which any or all of the Avrami parameters (limiting value A_L , rate constant k or Avrami exponent n) were made identical for each flour. The fits of different models were compared statistically. DSC results fitted a model with $n = 1$, slightly different limiting values and identical rate constants (K_D). Crumb compressibility data gave non-identical rate constants (K_C). Graphs of K_D and K_C versus loaf specific volume were plotted, including data from previous experiments. No overall relationship existed between K_D or k_C and loaf specific volume. Furthermore, although of the same order of magnitude, K_D and K_C bore no functional relationship to each other. AA

- 3290 RUSSELL (PL). A kinetic study of bread staling by differential scanning calorimetry and compressibility measurements. The effect of added monoglyceride. *J. Cereal Sci.* 1(4); 1983; 297-303

Inclusion of glyceryl monostearate (GMS), in the gel-state, as a dough constituent had a significant and clearly measurable effect upon the ageing of bread observed by both differential scanning calorimetry (DSC) and crumb compressibility measurement. Using DSC, a reduction in the rate of development of the 'staling endotherm', S, was observed in GMS-containing bread compared with control bread. Inclusion of GMS led to an increase in the size of the M2 endotherm associated with melting of the amylose-monoglyceride complex. The results were in agreement with a model, in which addition of GMS led to a reduction in the rate constant for development of the S endotherm (k_D) but which had no effect upon the limiting value A_L . This suggested that the S endotherm was due to crystallisation of the amylopectin fraction of the starch. From measurements of crumb compressibility it was concluded that the addition of GMS, as well as increasing loaf volume, also led to a reduction in the rate constant for crumb firming (k_C). This suggested that GMS had an effect within the crumb of bread during ageing and did not operate solely by increasing loaf specific volume. AA

COOKIE

- 3291 NOGUCHI (A) and CHEFTEL (J-C). Extrusion-cooking of protein-enriched cookies. (Time temperature measurements and Maillard reactions). *J. Jpn. Soc. Food Sci. Technol.* 30(2); 1983; 114-24

A mix containing 42% wheat flour, 20% corn starch, 20% sucrose, 11% soy protein isolate, 6% sodium caseinate, and 1% NaCl was texturized in a corotating twin screw Creusot-Loire BC-45 extruder. Temperature and pressure of the mix measured just before the die, and distribution of residence time measured using erythrosin, were reported as a function of water content, feed rate, screw rotation, and barrel temperature. Under usual operating conditions, 13% water, 40 kg/hour, and 80 rpm, the mix progressed without batchmax along the first 400 mm of screw length in 10 seconds; in the last 150 mm section, where the reverse screw element was located, the melted mix remained from 25 to 70 S, at about 200°C. Sucrose hydrolysis during extrusion, as determined by the invertase-glucose oxidase method, varied from 2 to 10% of initial sucrose. Loss in FOND reactive lysine caused by Maillard reaction was from 0 to 44%, depending mainly on temperature.

and water content, and not on screw rpm; lysine loss decreased when water content increased from 13% to 18%, even when the barrel temperature was increased so as to keep the temperature of the flour mix constant. Molar ratio of sucrose to lysine loss was always ≥ 1.2 . Decreasing the pH of the flour mix with citric acid or glucono- δ -lactone enhanced the loss of free reactive lysine. Severe conditions of extrusion-cooking also caused a decrease in cystine and arginine. AA

SPONGE CAKE

- 3292 FREDDI (C) and RAFFALDINI (G). On the nutritive value of snacks based on "Pan di Spagna" (or sponge cake). *Ind. Aliment.* 22(10); 1983; 713-6 (Italian)

Sponge cake has not only a high calorie content, but also provides a sufficient amount of protein, readily assimilable carbohydrates, calcium, iron, and phosphorus. Hence, the authors recommend that their nutritive value should be exploited in a better way, and that it is very wrong to treat them as "luxury" or "pleasure-giving" foods which provide only "empty calories". KMD

MILK AND DAIRY PRODUCTS

- 3293 MORAWSKI (J). Analysis of dairy products by HPLC. *Food Technol.* 38(4); 1984; 70-72, 74-8

Dairy industry is an area which can be served well by HPLC. A variety of analytical and quality control applications involving HPLC techniques can furnish information to industry on raw materials, processes and products. JVS

MILK

- 3294 McKELLAR (RC), FROEHLICH (DA), BUTLER (G), CHOLETTE (H) and CAMPBELL. The effect of uncooled storage on proteolysis, bitterness and apparent viscosity in ultra-high temperature milk. *Can. Inst. Food Sci. Technol. J.* 17(1); 1984; 14-7

Changes in proteolysis, bitterness and apparent viscosity in 2 batches of ultra-high-temperature milk from each of 4 dairies, 2 using the indirect and 2 the direct method of sterilization were examined during storage at 20 C for up to 30 weeks. Proteolysis and bitterness increased with time in milk from all 4 dairies. These changes were more apparent in milk sterilized by the direct method. Milk sterilized by the indirect method exceeded the manufacturer's expected shelf-life of 12 weeks while 2 of the 4 batches of directly sterilized milk spoiled within this period. Increases in apparent viscosity and gelation were detected in milk from dairies using the direct method of sterilization between 6 to 10 weeks after significant bitterness had developed. Close correlations (0.822-0.971) between proteolysis and time were observed for all 4 dairies. Proteolysis correlated well with bitterness (0.762-0.862) in milk sterilized by the direct method. Lower but highly significant ($p < 0.01$) correlations (0.477 and 0.507) were obtained with the other 2 dairies. These results suggest that rate of proteolysis could be used to predict shelf-life of ultra-high-temperature milk sterilized by the direct method. AA

- 3295 BASSETTE (R) and JEON (IJ). Effect of process- and storage-times and temperatures on concentrations of volatile materials in ultra-high-temperature steam infusion processed milk. *J. Food Prot.* 46(11); 1983; 950-53
- 3296 ZALL (RR), CHEN (JH) and MURPHY (SC). Effect of a refrigerated milk receiver on raw milk quality. *Dairy Food Sanit.* 3(11); 1983; 408-14
- 3297 SCHNEEMAN (BO) and DUNAIF (G). Nutritional and gastrointestinal response to heated nonfat dry milk. *J. Agric. Food Chem.* 32(3); 1984; 477-80
 Non fat dry milk (NFDM) was autoclaved for 30-45 minutes to produce Maillard products and included in rat diets. As compared to controls (whose diets contained unheated NFDM), the groups fed autoclaved NFDM showed reduced food intake, and body weights as also enlarged kidney, stomach, small intestine and large intestine; the enlargement of pancreas and liver was not noticeable in heated NFDM fed groups. Trypsin activity of pancreas or liver was elevated and amylase activity reduced. JVS
- 3298 ZAJAC (M), GLADYS (J), SKARZYNSKA (M), HARNULV (G) and BJORCK (L). Changes in bacteriological quality of raw milk stabilized by activation of its lactoperoxidase system and stored at different temperatures. *J. Food Prot.* 46(12); 1983; 1065-8
- 3299 PAUL (P) and THURM (V). Determination and occurrence of aflatoxin M₁ in milk and powdered milk products. *Nahrung.* 27(9); 1983; 877-82 (German)
 Basing on a review of the present situation of the contamination of milk and powdered milk products with aflatoxin M₁, a further investigation is regarded as necessary to assess the hygienic, toxicological situation. For this purpose, the TLC detection method of Tuinstra and Bronsgeest is recommended, which was modified to be used with powdered milk and babyfood. This method enables the detection of 0.04 g mM₁/l milk and 0.5 µg/kg powdered milk respectively on practical conditions. Investigating 142 raw milk samples and 70 samples of powdered milk products, only 2 positive powdered milk samples were detected. This relatively low contamination rate is explained by the use of feed that is predominantly produced in the GDR and that is vastly free from aflatoxins. According to these results, it is possible to estimate the contamination of milk with aflatoxin M₁ in the GDR as extremely low. AA
- 3300 BUSHWAY (RJ), McGANN (DF) and BUSHWAY (AA). Gas chromatographic method for the determination of solanidine and its application to a study of feed-milk transfer in the cow. *J. Agric. Food Chem.* 32(3); 1984; 548-51
 Extensive use of potato waste (which contains about 400 ppm of the glycoalkaloid, solanidine) as animal feed can pose health problems to humans also since they consume milk and other dairy products. The method reported here for the determination of solanidine, consists in partitioning of milk into toluene, and subsequent quantitation by GC (Detection limit 0.14 ppm; recovery of solanidine added at levels of 1.12, 0.56 and 0.28 ppm was 93%). JVS
- 3301 CERBULIS (J), PARKS (OW), LIU (RH), PIOTROWSKI (EG) and FARRELL (HM) Jr. Occurrence of diesters of 3-chloro-1,2-propanediol in the neutral lipid fraction of goat's milk. *J. Agric. Food Chem.* 32(3); 1984; 474-6
 A minor fraction which moved ahead of triglycerides on TLC plates and was identified as fatty acid diesters of 3-chloro-1,2-propanediol was present in the neutral lipid fraction of goats milk. This finding demonstrates the presence of this class of halolipids in a natural unprocessed food. The presence of such a compound has been demonstrated earlier in contaminated Spanish olive oil. JVS

- 3302 GOLDSMITH (SJ), DICKSON (JS), BARNHART (HM), TOLEDO (RT) and EITEN-MILLER (RR). IgA, IgG, IgM and lactoferrin contents of human milk during early lactation and the effect of processing and storage. *J. Food Prot.* 46(1); 1983; 4-7
- 3303 DILL (CW), CHEN (CT), ALFORD (ES), EDWARDS (RL), RICHTER (RL) and GARZA (C). Lipolytic activity during storage of human milk: Stability of the bile salt-stimulated lipase. *J. Food Prot.* 46(11); 1983; 994-6
- Bile salt-stimulated lipase activity was monitored in fresh human milk and skim milk during refrigerated (4 C) and frozen (-20 C) storage, and in the lyophilized milks stored at -20 C and at room temperature. Following a sharp initial drop to approximately 77% of the original lipase activity, lipase was relatively stable in frozen or freeze-dried milks during 180 days of storage at -20 C. Activity losses were greatest ($P < 0.05$) in freeze-dried whole milks and skim milks stored at room temperature, approximating a 30% loss during 30 days of storage. Lipase activity was stable during refrigerated (4 C) storage of whole milk for 1 week. AA

BUTTER

- 3304 HANKIN (L) and HANNA (JG). Quality of butter and blends of butter with oleomargarine. *Dairy Food Sanit.* 3(12); 1983; 458-60
- 3305 CADDEN (AM) and KENNELLY (JJ). Influence of feeding canola seed and a canola-based protected lipid feed supplement on fatty acid composition and hardness of butter. *Can. Inst. Food Sci. Technol. J.* 17(1); 1984; 51-3

WHEY

- 3306 RENNER (E). Nutritional evaluation of the whey beverage "big M". *Gordian.* 83(10); 1983; 208-9 (German)
- This brief review covers: value of whey; nutrients in whey; lactic acid and vitamins in whey; actual and recommended intakes of vitamin E; and some technological aspects. KMD
- 3307 BEVERIDGE (T), JONES (L) and TUNG (MA). Stranded structure development in thermally produced whey protein concentrate gel. *Food Microstructure.* 2(2); 1983; 161-3

CHEESE

- 3308 JAMESON (GW). Some recent advances in cheese technology. *CSIRO Food Res. Q.* 43(3); 1983; 57-66
- Aspects covered in this review are: treatment of cheese milk, starters, rennet, rennet substitutes and milk coagulation, addition of whey proteins in cheese manufacture; cheese manufactured from stored forms of milk; accelerated maturation; some technological factors influencing cheese flavour formation; retarded maturation and preservation, cheese yield; ultrafiltration in cheese manufacture; and cheese quality and quality prediction. KAR
- 3309 SUAREZ (JA), BARNETO (R) and INIGO (B). Contribution to study of Mahon cheese. III. Lactic acid bacteria and enterococci. *Chem. Mikrobiol. Technol. Lebensmittel.* 8(2); 1983; 52-6
- A taxonomic study of bacterial strains isolated from milk, curd, and Mahon cheese - a type of cheese made in Minorca - was carried out over a maturation period of 4 months. 820 strains belonging to the genera, *Streptococcus*, *Lactobacillus*, and *Leuconostoc* were identified. Among them only 4

species of lactic acid bacteria were found, viz: *Lactobacillus plantarum*, *Lactobacillus casei*, *Streptococcus lactis*, and *Leuconostoc lactis*. The dominant species was *L. plantarum*, which accounts for almost all of the lactic flora during the last stages of maturation. Lactic cocci were present only in small amounts; thus, *Streptococcus lactis* amounted to only 9.3%. However, a significant proportion of *Enterococci* could also be identified. In all three products, *S. faecalis* var. *faecalis* and *S. faecalis* var. *liquefaciens* were present in the ratio 1:1 approximately, while *S. durans* was the dominant species. KMD

MEAT AND POULTRY

MEAT

- 3310 BERG (RT) and WALTERS (LE). The meat animal: Changes and challenges. *J. Anim. Sci.* 57(2); 1983; 133-46

Discusses: factors influencing proportion of fat and muscling; fat partitioning and distribution; muscle growth and development; bone growth and distribution; live animal evaluation and that intact males for meat production. BSN

- 3311 BREIDENSTEIN (BC) and CARPENTER (ZL). The red meat industry: Product and consumerism. *J. Anim. Sci.* 57(2); 1983; 119-32

Discusses: slaughter dressing; grading; improving quality - palatability of fresh meat; fresh meat distribution; processing; marketable atmosphere; consumption patterns; consumer perceptions; regulations and policy; and future. BSN

- 3312 ROWE (RWD). The structure and quality of meat. *CSIRO Food Res. Q.* 43(3); 1983; 67-72

This paper points out some of the structural features of meat which, need further investigation and consideration in developing updated explanations of the variability of meat toughness. KAR

- 3313 ZEE (JA), SIMARD (RE) and HEUREUX (LL). Evaluation of analytical methods for determination of biogenic amines in fresh and processed meat. *J. Food Prot.* 46(12); 1983; 1044-9, 1054

Fifteen biogenic amines were separated and quantitated by an automated ion-exchange chromatography technique. Extraction efficiencies for amines from fresh and processed meat using trichloroacetic acid (TCA), perchloric acid and methanol were compared. In general, biogenic amines in meat and meat products were better extracted by TCA. Aliphatic amines were more efficiently extracted than aromatic amines. Type of meat and adsorption of amines on proteins probably affected the extraction efficiency. Both fresh and processed meat products contained high amounts of adrenaline, spermidine and spermine (up to 581,280 and 685 mg/kg, respectively), but low amounts (13 to 19 mg/kg) of noradrenaline, putrescine, histamine, cadaverine and tyramine. Processed meat contained less amines than fresh meat, suggesting losses during salting and curing or microbial growth inhibition. AA

- 3314 MULLER (H), SIEPE (V) and STADELMANN (W). Quantitative determination of creatinine in meat extracts and meat-extract holding foodstuffs by using HPLC in the Carisano et al method. *Dtsch. Lebensmittel-Rundschau.* 79(12); 1983; 395-428 (German)

- 3315 SEIDEMAN (SC) and DURLAND (PR). The effect of cookery on muscle proteins and meat palatability: A review. *J. Food Quality*. 6(4); 1984; 291-314

The review covers: the effect of heat on meat palatability; water-holding capacity of meat; muscle structure; muscle proteins, sarcoplasmic proteins and on muscle protein solubility; on myofibrillar proteins; and connective tissue. KAR

- 3316 SWATLAND (HJ). Morphometry of meat by scanning light microscopy. *Food Microstructure*. 2(2); 1983; 135-41

Morphometric data can be collected from meat by using a scanning stage and a photometer, both controlled by a microcomputer. The passive counting of connective tissue boundaries is given as an example to show that enumerative data may be biased by the ratio of the width of the subject of measurement to the projected diameter of the photometer aperture. In a second example, the scanning stage is activity directed by the observer and is used to map the radial distribution of succinate dehydrogenase (SDH) activity in different histochemical types of muscle fibers. This is accomplished by the arbitrary fitting by the microcomputer of reference features (plumb line and corners) to the muscle fiber perimeter. Concentric zones of the resulting data matrix are unpacked to calculate radial gradients of SDS activity within muscle fibers. AA

- 3317 KANNER (J), HAREL (S), SHAGALOVICH (J) and BERMAN (S). Antioxidative effect of nitrite in cured meat products: Nitric oxide-iron complexes of low molecular weight. *J. Agric. Food Chem.* 32(3); 1984; 512-5

The activity of iron-nitric oxide complexes of low molecular weight toward lipid peroxidation was studied in a linoleate- β -carotene model system. Cysteine, and especially cysteine in the presence of iron ions, caused a rapid increase in β -carotene destruction. Compared with cysteine, the complex of cysteine-Fe-NO had no prooxidant effect. Addition of the cysteine-Fe-NO complex to the model containing cysteine-Fe²⁺ or hemin inhibited β -carotene oxidation by 77% and 86% respectively. The activity of hemin-NO on lipid oxidation was studied and compared under the same experimental conditions and concentrations as that of hemin. In the range of tested concentrations (1.8-9.0 μ M), hemin acted as a prooxidant toward carotene oxidation and hemin-NO as an antioxidant. The antioxidative effect of hemin-NO was maintained even in the presence of lipoxxygenase and myoglobin. The possible role of nitric oxide on the stabilization of lipid peroxidation in muscle foods is discussed. AA

- 3318 SMITH (JL) and PALUMBO (SA). Use of starter cultures in meats. *J. Food Prot.* 46(11); 1983; 997-1006

Discusses: characteristics of meat starter cultures; use in meats; effect on trichinae; biogenic pressor amines and meat starter cultures; nitrosamines and lactic acid starter cultures; mycotoxins and mold starter cultures; viruses and lactic acid and starter cultures; foodborne bacteria and lactic acid starter cultures. BSN

BEEF

- 3319 RAY (EE), BERRY (BW), LOUCKS (LJ), LEIGHTON (EA) and GARDNER (BJ). Effects of electrical stimulation and conditioning periods upon pre-rigor beef samples cooked with a microwave oven. *J. Food Prot.* 46(11); 1983; 954-6, 964

- 3320 VIMINI (RJ), FIELD (RA), RILEY (ML) and VARNELL (TR). Effect of delayed bleeding after captive bolt stunning on heart activity and blood removal in beef cattle. *J. Anim. Sci.* 57(3); 1983; 628-31
- 3321 MURPHEY (CE), RECIO (HA), STIFFLER (DM), SMITH (GC), SAVELL (JW), WISE (JW) and CROSS (HR). Effects of trimming external fat from beef carcasses on the accuracy of determining USDA yield grade. *J. Anim. Sci.* 57(2); 1983; 349-354
- 3322 GAYDOU (EM), IATRIDES (MC), RAMANANARIVO (R), ARTAUD (J) and PEIFFER (G). Pattern recognition analysis of fatty acids. Application to beef fat tissue classification. *J. Agric. Food Chem.* 32(3): 1984; 651-5
Depot fats of *Bos taurus* and *B. indicus* were investigated for fatty acid composition by GLC. Multivariate statistical techniques were used to distinguish various animal fats. The data reported in this study indicate the importance of minor fatty acids for characterising beef fat tissues. JVS
- 3323 CARDELLO (AV), SEGARS (RA), SECRIST (J), SMITH (J), COHEN (SH) and ROSENKRANS (R). Sensory and instrumental texture properties of flaked and formed beef. *Food Microstructure.* 2(2); 1983; 119-33
- 3324 SAWYER (CA), NAIDU (YM) and THOMPSON (S). Cook/chill foodservice systems: Microbiological quality and end-point temperature of beef loaf, peas and potatoes after reheating by conduction, convection and microwave radiation. *J. Food Prot.* 46(12); 1983; 1036-43
Microbiological quality, as estimated from temperature and mesophilic aerobic plate counts of beef loaf, instant mashed potatoes and frozen peas, was determined at point of service to compare conduction, convection and microwave reheating in a hospital-type cook/chill foodservice system. Although reheated products were similar microbiologically (mean log CFU/g = 2.3 to 3.4), internal and temperatures, even under laboratory-controlled conditions, did not meet FDA recommended standards (≥ 74 C) for reheated products in up to 83% of situations observed. Such data demonstrate the potential for foodborne illness in hospital cook/chill foodservice systems. AA
- 3325 WHITE (CA) and HALL (LP). The effect of temperature abuse on *Clostridium perfringens* and *Bacillus cereus* in raw beef and chicken substrates during frozen storage. *Food Microbiol.* 1(2); 1984; 97-104
C. perfringens grew in the thawing substrates at 20 C after one month but not after two months frozen storage. Substantial growth of *C. perfringens* and *B. cereus* occurred during 24 hours of thawing at 27 C in chicken and beef substrates and this was maintained throughout the frozen storage. Refreezing thawed samples reduced viable counts of *C. perfringens* and *B. cereus* by up to 99 and 97% respectively. KAR
- 3326 SCHIEMANN (DA). Comparison of enrichment and plating media for recovery of virulent strains of *Yersinia enterocolitica* from inoculated beef stew. *J. Food Prot.* 46(11); 1983; 957-64

CATTLE

- 3327 GREATHOUSE (JR), HUNT (MC), DIKEMAN (ME), CORAH (LR), KASTNER (CL) and KROPF (DH). Ralgro-implanted bulls: Performance, carcass characteristics, longissimus palatability and carcass electrical stimulation. *J. Anim. Sci.* 57(2); 1983; 355-363

MUTTON

- 3328 VASUNDHARA (TS), KUMUDAVALLY (KV) and SHARMA (TR). Altered free fatty acid levels in fresh or canned mutton as indicators of spoilage. *J. Food Prot.* 46(12); 1983; 1050-54

Chromatographic profiles of neutral lipids from canned mutton products can indicate the presence of spoiled meat presterilization, particularly from changes in free fatty acid levels. Gas liquid chromatography analysis of free fatty acids of lean meat showed a 15-fold increase in palmitic, stearic and oleic acid contents as a result of canning spoiled meat when compared to insignificant increases in canned fresh meat. AA

PORK

- 3329 RAYMAN (K), MALIK (N) and HURST (A). Failure of nisin to inhibit outgrowth of *Clostridium botulinum* in a model cured meat system. *Appl. Environ. Microbiol.* 46(6); 1983; 1450-52

Up to 550 ppm (550 µg/ml) of nisin in combination with 60 ppm (60 µg/ml) of nitrite failed to prevent outgrowth of *C. botulinum* spores in pork slurries adjusted to pH 5.8. Reducing the pH enhanced nisin activity. Proteolytic and nonproteolytic type B spores were equally resistant to nisin. AA

PIG

- 3330 QUEFFELEC (A), FROSTIN (F), CORRE (L) and JACQ (H). The Louis GAD Co., European leader in pig-slaughter, replaces heavy fuels with electricity. *Ind. Aliment, Agric.* 100(12); 1983; 1005-11 (French)

HOG

- 3331 FORTIN (A), HOSKINS (VE) and SIM (DW). Regional characteristics of hog carcasses in Canada: A survey conducted in the spring of 1981. *Can. J. Anim. Sci.* 63(3); 1983; 551-61

VEAL

- 3332 SMULDERS (FJM) and WOOLTHUIS (CHJ). Influence of two levels of hygiene on the microbiological condition of veal as a product of two slaughtering/processing sequences. *J. Food Prot.* 46(12); 1983; 1032-5

POULTRY

- 3333 PERRY (GC). Intensive animal production and animal welfare. The present and future. *World Poult. Sci. J.* 39(2); 1983; 99-105

- 3334 EUROPEAN FEDERATION. Poultry meat quality. *World Poult. Sci. J.* 39(1); 1983; 64-73

The report of the working group V of the WPSA European Federation provides multilingual list of terms relating to the various organs of the birds. BSN

- 3335 WESLEY (RD), SWAMINATHAN (B) and STADELMAN (WJ). Isolation and enumeration of *Campylobacter jejuni* from poultry products by a selective enrichment method. *Appl. Environ. Microbiol.* 46(5); 1983; 1097-102
- 3336 JOHNSTON (RW). *Salmonella* in meat and poultry products. *Dairy Food Sanit.* 3(11); 1983; 415-7
Discusses. Surveillance programme for establishments and twelve month assessment by microbiology division of the cooked beef results. BSN

CHICKEN

- 3337 BASKER (D), ANGEL (S) and BARTOV (I). Sensory quality of chicken meat as a function of its fatness: Comparison of meat loaf with meat cooked in water. *J. Food Quality.* 6(4); 1984; 253-8
Broiler chicken carcasses were classified as being lean, medium or fat, according to the proportion by weight of abdominal fat. The sensory quality was evaluated of breast and dark meat cooked separately in water, and of meat loaf containing both breast and dark meat. When cooked in water, the differences in the degree of fatness were found to have essentially no effect on the sensory quality. When cooked as meat loaf, the product of medium fatness was found to have the highest sensory quality, followed by the fat meat product and finally by the lean meat product. AA
- 3338 PADDA (GS). Prospects of comminuted poultry products in India. *Poult. Guide.* 20(9); 1983; 17-9
The current Indian preference for chicken curry and "tandoori" chicken creates the problem of utilization of the tougher meat of older birds. Hence, the author has suggested development of mince-meat from poultry which could be eaten with rice or chapati, stuffed in parathas, nan, puri and samosa, made into snacks like kabab, koftas, pakoras, or cooked with vegetables, like shredded cabbage and spinach-like greens, or dals. KMD

EGG

- 3339 DEVARAJA (KJA). Paper moulded egg tray manufacturing industry. *Poult. Guide.* 20(9); 1983; 29-30
It is estimated that a medium-sized egg tray manufacturing plant, with an output of 20,000 trays (30 egg)/day would require an investment of Rs. 1.8 million and bring a profit of Rs. 3,300/day. The ex-factory cost of each tray is put at Re.0.42, and its selling price at Re. 0.62 (including a commission of Re.0.05). KMD
- 3340 MAYES (FJ) and TAKEBALLI (MA). Microbial contamination of the hen's egg: A review. *J. Food Prot.* 46(12); 1983; 1092-8
Discusses: contamination before and after laying; and physical and chemical defences against bacterial attack. BSN

SEAFOODS

FISH

- 3341 DHAMIJA (OP). Compulsory quality control and pre-shipment inspection of fish and fishery products in India. *Seafood Export J.* 15(9); 1983; 9-17
The pattern of quality control and pre-shipment inspection of fish and fishery products prevailing in India has been described, with special attention to the microbiological standards that are applied. The advantages of the in-plant quality control scheme, and the consequent progress made by the fish industry have been mentioned. KMD

- 3342 AHAMED (A) and MATCHES (JR). Alcohol production by fish spoilage bacteria. *J. Food Prot.* 46(12); 1983; 1055-9
Bacterial isolates (244) identified to genera were tested for their ability to produce ethanol, isopropanol and propanol in a fish tissue extract. All of the isolates produced ethanol and 241 and 227 produced isopropanol and propanol, respectively. One high alcohol producing member of each of the groups *Moraxella* like, *Pseudomonas*, *Flavobacterium*, *Micrococcus* and *Corynebacterium* was selected for utilization of fish components as substrates in production of alcohol. The substrates tested included four sugars, nine amino acids and lactic and pyruvic acids. Although there were some variations in the levels of alcohols produced by the test organisms from the substrates, the organisms appeared to prefer simple 5 and 6 carbon sugars and then utilized the free amino acids. The level of oxygenation greatly affected the levels of alcohols produced. AA

- 3343 GIDDINGS (GG). Radiation processing of fishery products. *Food Technol.* 38(4); 1984; 61-5,94
The four applications, namely, radurisation (or pasteurisation of certain finfish and shellfish), radicidation (or sanitisation of frozen products), destruction of insect eggs and larvae and radiation sterilisation (radappertisation) have been discussed. A comprehensive discussion has also been presented on the question of *Clostridium botulinum* in fish/fishery products, in the light of irradiation practices. JVS

- 3344 WELSH (FW) and ZALL (RR). Use of a model scale system for recycling spent fishery, fishery brines. *J. Food Prot.* 46(12); 1983; 1026-31

COD

- 3345 WOYEWODA (AD), BLIGH (EG) and SHAW (SJ). Controlled and modified atmosphere storage of cod fillets. *Can. Inst. Food Sci. Technol. J.* 17(1); 1984; 24-7

In cod fillets stored for 15 days in modified atmosphere (60% CO₂-40% air) at 1 C, significantly lower *Alteromonas putrefaciens* counts and trimethylamine values were observed, as compared to cod fillets stored under controlled atmosphere. BSN

- 3346 BREWER (P), HELBIG (N) and HAARD (NF). Atlantic cod pepsin Characterization and use as a rennet substitute. *Can. Inst. Food Sci. Technol. J.* 17(1); 1984; 38-43

HAKE

- 3347 RACICOT (LD), LUNDSTROM (RC), WILHELM (KA), RAVESI (EM) and LICCIARDELLO (JJ). Effect of oxidizing and reducing agents on trimethylamine N-oxide demethylase activity in red hake muscle. *J. Agric. Food Chem.* 32(3); 1984; 459-64
- Addition of oxidising agents (H_2O , NaOCl and KBr O_3) to minced red hake reduced the rate of formation of dimethylamine and formaldehyde; in contrast, the addition of reducing agents increased their formation. JVS

MACKEREL

- 3348 TASHIRO (I), ITOH (S) and TSUYUKI (H). Postional difference of total lipids and neutral lipids in horse mackerel. *J. Jpn. Soc. Food Sci. Technol.* 30(2); 1983; 79-87 (Japanese)
- Total lipids extracted from ordinary meat, red meat, skin, liver and viscera (except liver) of horse mackerel, *Trachurus japonicus* were examined by means of silicic acid column chromatography (SACC), thin layer chromatography (TLC) and gas chromatography (GC). The total lipid content (%) in viscera was the highest among five parts examined. Total lipids were separated into neutral and compound lipid fractions by mean of SACC. Ratios of neutral lipid fractions in total lipids were 79.0~96.4%, and the content (%) of neutral lipid fraction in liver was the lowest in five parts. Neutral lipid fractions were separated into 7 kinds of lipids by TLC and the main component was triacylglycerins (TG 93.6~97.5%). Positional difference of each neutral lipid content (%) was small. Fatty acid composition of total lipids and each neutral lipid was studied by GC and above 30 kinds of fatty acids were identified. Main fatty acids of total lipids and each neutral lipid in five parts were 16:0 acid (20.9~23.2%), 18:1 acid (19.0~30.1%), 22:6 acid (10.3~15.9%), 20:5 acid (7.1~9.5%), 18:0 acid (5.8~10.1%) and 16:1 acid (6.1~8.1%). In the fatty acid composition of total lipids and TG, 18:1 acid content (%) in liver was rather higher than in the others. On the contrary, little positional difference in fatty acid composition of free fatty acid fraction and sterol ester fraction was recognized. AA

CRAB

- 3349 WENTZ (BA), DURAN (AP), SWARTZENTRUBER (A), SCHWAB (AH) and READ (RB) Jr. Microbiological quality of fresh blue crabmeat, clams and oysters. *J. Food Prot.* 46(11); 1983; 978-81
- The microbiological quality of fresh blue crabmeat, soft- and hardshell clajms and shucked eastern oysters was determined at the retail (crabmeat, oysters) and wholesale (clams) levels. Geometric means of aerobic plate counts incubated at 35 C were: blue crabmeat 140,000 colony-forming units (CFU)/g, hardshell clams, 950 CFU/g, softshell clams 680 CFU/g and shucked Eastern oysters 390,000 CFU/g. Coliform geometric means ranged from 3.6/100 g for hardshell clams to 21/g for blue crabmeat. Means for fecal coliforms or *Escherichia coli* ranged from <3/100g for clams to 27/100 g for oysters. The mean *Staphylococcus aureus* count in blue crabmeat was 10/g. AA

SHRIMP

- 3350 FINNE (G) and MARTIN (R). Distribution of soluble filth in shrimp during processing. *J. Food Prot.* 46(11); 1983; 990-93

The objective of this research was to evaluate the distribution of soluble filth in shrimp during different stages of processing. Flies, fed a radioactive glucose isotope, were added to five pounds of headless shell-on shrimp tails (green-headless) and also to five pounds of peeled and deveined shrimp tails. The shrimp were blast frozen as five pound blocks, glazed with distilled water and stored for 10 days at -26 C. After thawing, washing, and rinsing, 44.4% of the total radioactivity from the added flies remained on the green-headless shrimp. Reconditioning of the peeled and deveined shrimp through thawing and multiple washings resulted in 18.2% retention of total activity. Even though cooking caused an additional 8.2% loss of activity, the cooked shrimp still had 10% of the original radioactivity associated with it. AA

PROTEIN FOODS

Nil

FRUIT JUICES AND BEVERAGES

- 3351 DAVIES (AG). Theoflavins. Objective indicators of quality. *Tea Coffee Trade J.* 155(2); 1983; 34
- 3352 SCHMIDT (RH) and DAVIDSON (SM). Carbonyl levels in oilseed-based beverage products during growth of *Streptococcus lactis*. *J. Food Sci.* 48(4); 1983; 1372-3, 1375

FRUIT JUICES

- 3353 BOHM (H). Stainless steel and its usage in the beverage industry. *Flussiges Obst.* 50(9a); 1983; 501-7 (French)
- 3354 PFEFFER (R). Pump development in the fruit juice industry. *Flussiges Obst.* 50(9a); 1983; 508-11 (French)
- 3355 KONIGS (P). Fruit juice and glass - partner in tradition and progress. *Flussiges Obst.* 50(9a); 1983; 518-21 (French)
- 3356 ANON. Attractive dressing - long development of bottle labelling. *Flussiges Obst.* 50(9a); 1983; 523-5 (French)
- 3357 ANON. Driving force in the fruit juice market - development of soft packs for liquid fruit. *Flussiges Obst.* 50(9a); 1983; 526-9 (French)
- 3358 BERGNER-LANG (B), KACHELE (M) and STENGEL (E). Analysis of patulin in fruit juices and fruit products. *Dtsch. Lebensmittel-Rundschau.* 79(12); 1983; 400-404 (German)

Various methods of patulin estimation were tested on different products - like apple juice, apple sauce, various other juices and nectars - after appropriate modifications. Patulin can be detected by two-dimensional, thin-layer chromatography. Quantitative determination of patulin is possible by a simple, or two-dimensional, thin-layer chromatographic procedure,

followed by densitometric evaluation. The limit of detection by this method is 20 ppb. A very sensitive and specific gas-chromatographic/mass-spectrometric procedure has also been worked out. For this procedure, it is necessary to obtain patulin acetate by treating the patulin with acetic anhydride; the detection limit is 1 ppb. KMD

PASSION FRUIT JUICE

- 3359 GAYDOU (EM) and RAMANOELINA (ARP). Utilization of the by-products of the passion fruit juice industry: Fatty acids and sterol composition of the seed oil. *Fruits*. 38(10); 1983; 699-703 (French)

The seeds of three species of passion fruit (*Passiflora edulis* Sims, *P. edulis* var. *flavicarpa*, and *P. foetida*) have been studied. They represent 8-9% of the weight of the fresh fruit, and contain 22-28% of oil. The fatty acid composition of the oil is very much like that of sunflower. The three major acids are linoleic (57-66%), oleic (18-20%) and palmitic (10-14%); the linolenic acid content is very low (0.8-1.1%). The sterol fraction consists mainly of β -sitosterol (49%), campesterol (10-12%) and stigmasterol (18-28%). Thus, passion fruit seeds can be used as food. KMD

CITRUS JUICE

- 3360 NOMURA (T), YUGE (H), MATSUMOTO (K) and OSAJIMA (Y). A cell design for measuring sugar content of citrus juice. *J. Jpn. Soc. Food Sci. Technol.* 30(2); 1983; 68-72 (Japanese)

A dipping type four-electrode cell was designed and constructed for practical determination of sugar content in *citrus juice* by means of our new method based on conductometry. The characteristics of the A.C. four-electrode cell method as conductometry were investigated in concentrate electrolyte solution, such as 0.6 M KCl solution, by use of a pilot cell with reproducibly exchangeable current-carrying electrodes. It was suggested that the impedances between probe electrodes showed the exact solution resistances, not being affected by current-carrying electrodes and measuring frequencies. On the basis of data obtained a dipping type practical cell was devised with bright platinum wires of 0.3 and 0.5 mm diameter as probe and current-carrying electrodes, respectively, which the cell constant was 68.1 cm^{-1} . The response time of the practical cell was nearly zero and no change of the measured value was produced for 30 minutes successive run. The reproducibility was C.V. = 0.02% on repeated runs by the conductivity measurements of 0.6 M KCl solution with the practical cell. AA

- 3361 HASEGAWA (S), DILLBERGER (AM) and CHOI (GY). Metabolism of limonoids: Conversion of nomilin to obacunone in *Corynebacterium fasciens*. *J. Agric. Food Chem.* 32(3); 1984; 457-9

Limonin is the major limonoid in citrus juices and a major cause of bitterness. Recently it has been shown that nomilin appears to play a role in limonoid bitterness. Treatment of orange juice serum with *C. fasciens* immobilised in acrylamide gel converted nomilin to 3 metabolites. These metabolites were isolated but the principal one was identified as obacunone. JVS

COFFEE

- 3362 MASTERSON (J). Trends in coffee consumption. *Tea Coffee Trade J.* 155(3); 1983; 24-5, 44-45

- 3363 ANON. Screening procedure for coffee for export. *Indian Coffee* 47(10); 1983; 26-30

Contains specifications relating to sampling, as well as latest Indian standards for roasted and ground coffee, roasted coffee-chicory powder, soluble coffee powder, roasted chicory powder, and the price differential scale for the 1983/84 season. KMD

- 3364 ANON. Grade designations of monsooned coffee and their requirements. *Indian Coffee*. 47(10); 1983; 26

A short table gives the sieving requirements and garbling tolerances. KMD

- 3365 ANON. Grade designations of Indian green coffee and their requirements. *Indian Coffee*. 47(10); 1983; 21-5

The definitions of various terms used in the grading of Arabica coffee - viz. Plantation PB; Plantation 'A', 'B' or 'C'; Plantation "Bulk", "Bits", or "Black"; triage - have been given. Similar definitions have been given for the terms used for Robusta coffee. Grading and sieving requirements and tolerance in garbling have also been specified. KMD

- 3366 SAKANE (Y), NITANDA (T), SHIMODA (M) and OSAJIMA (Y). Headspace gas chromatographic analysis on aroma of coffee beverage. *J. Jpn. Soc. Food Sci. Technol.* 30(2); 1983; 108-110 (Japanese)

An internal standard method for the gas chromatographic headspace analysis on the aroma of coffee brew was developed. Five grams of ground coffee was weighed into a 130 ml conical flask, and 50 ml of the internal standard solution (sec-butanol, 2.5 μ l/50 ml H₂O) was added. The flask was closed with a silicon rubber having a headspace gas sampling device and incubated at 20 C for 90 minutes. 0.5 ml of the headspace gas was applied to a gas chromatograph. It was observed that a linear relationship existed between the amount of internal standard and peak area. Ground coffee adsorbed the internal standard in proportion to its concentration, the adsorbed amount was about 6%, and the reproducibilities (for quantitative analysis of the aroma constituents in the headspace gas) ranged from 2.2 to 9.6% based on the coefficient of variation. AA

- 3367 GROSSMAN (EM). Some methodological issues in the conduct of caffeine research. *Food Chem. Toxicol.* 22(3); 1984; 245-9

- 3368 BETANCOURT (L) and FRANK (HK). Conditions for the microbial spoilage of green coffee: Part 1. Sorption behaviour and mould formation. Part 2. Formation of mycotoxins. *Dtsch. Lebensmittel-Rundschau* 79(11&12); 1983; 366-9 and 404-7 (German)

Green coffee beans treated by the wet fermentation method adsorbed water-vapour more rapidly than the beans treated in a dry condition. Measurements of change in colour were not an adequate substitute for measurement of water content. Spoilage due to mould growth begins when the moisture content of the bean reaches 14%. This moisture content is reached in 2 weeks when the RH of the ambient air is 80%; but when the RH was reduced to 75%, no mould growth was observed for a period of 3 months. Ochratoxin A was found quite frequently in green coffee beans; aflatoxins and sterigmatocystin were found only rarely, even though the fungi which produce these latter toxins were found frequently in green coffee. It has been demonstrated that caffeine has a good inhibitory effect on the biosynthesis of sterigmatocystin, whereas its inhibitive effect on the formation of ochratoxin is poor, and of patulin very poor. KMD

- 3369 ANON. Indian Standard code of practice for construction of coffee seed storage structures. *Indian Coffee*. 47(10); 1983; 18-21
The standard relates to storage of coffee seeds in bags; detailed specifications are given relating to the foundation, plinth, floor, walls, door air vents, ventilators, roof, drainage, and underground drainage by a rubble drain. KMD
- 3370 YOKOGOSHI (H), MOCHIZUKI (S), TAKAHATA (M), QUAZI (S) and YOSHIDA (A). The hypercholesterolemic effect of caffeine-containing beverages and xanthine-derivatives in rats. *Nutr. Rep. Int.* 28(4); 1983; 805-14
The effects of instant coffee, black tea, green tea, cocoa, decaffeinated coffee, caffeine analoges on serum cholesterol in rats were investigated. In the supplementation of 10% coffee, 6.6% black tea, 6.6% green tea and 19.4% cocoa to 20% casein diet, serum cholesterol rose significantly. With increasing intake of coffee, serum total cholesterol and HDL-cholesterol concentrations increased, while the triglyceride concentration and body weight gain gradually decreased. KAR
- 3371 MISLIVEC (PB), BRUCE (VR) and GIBSON (R). Incidence of toxigenic and other molds in green coffee beans. *J. Food Prot.* 46(11); 1983; 969-73
The mold flora of 944 green coffee bean samples from 31 coffee-producing countries was determined before and after surface disinfection with 5% NaOCl. Molds were detected on 99.1% of 47,200 beans not surface-disinfected and in 47.9% of 47,200 disinfected beans. Although the percentage of differences in occurrence of mold before disinfection was minimal (93.4 to 100%) on a country-by-country basis, after disinfection, the beans from Asiatic and African countries showed more internal invasion (80.5%) than those from Central and South America (49.4%). *Aspergillus* spp., which dominated the mold flora of 944 samples before and after disinfection, included the toxigenic *A. ochraceus*, *A. flavus* and *A. versicolor* as well as *A. niger*, *A. tamarii*, *A. wentii* and species of the *A. glaucus* group. The genus *penicillium*, including the toxigenic *P. cyclopium*, *P. citrinum* and *P. expansum* was detected regularly, although its occurrence was substantially lower than that of the aspergilli, especially after surface disinfection. The rare detection of *Alternaria* and *Fusarium* indicated that toxigenic species of these genera do not readily invade green coffee beans. *A. flavus* and *A. tamarii* were prevalent in Central and South American beans, whereas other aspergilli were prevalent in Asiatic and African beans. The penicillia were prevalent in Central and South American beans. AA
- 3372 STACK (ME), MISLIVEC (PB), DENIZEL (T), GIBSON (R) and POHLAND (AE). Ochratoxins A and B, xanthomegnin, viomellein and vioxanthin production by isolates of *Aspergillus ochraceus* from green coffee beans. *J. Food Prot.* 46(11) 1983; 965-8
Isolates from *Aspergillus ochraceus* obtained from green coffee beans were cultured on rice and water. After 20 days of growth, the cultures were extracted with chloroform and the extracts were analyzed by high performance liquid chromatography for ochratoxin A (OA), ochratoxin B (OB), xanthomegnin (X), viomellein (V) and vioxanthin (VX). Forty three percent of the isolates produced OA at an average level of 397 μg of toxin/g rice, 17% produced OB at an average level of 312 $\mu\text{g/g}$, and 84% produced X, V, and VX at an average level of 281, 417 and 386 $\mu\text{g/g}$ respectively. The highest levels of toxin production were OA, 2088 $\mu\text{g/g}$; OB, 3375 $\mu\text{g/g}$; X, 1562 $\mu\text{g/g}$; V, 2514 $\mu\text{g/g}$; and VX, 2054 $\mu\text{g/g}$. VX has not previously been reported as an *A. ochraceus* metabolite. AA

TEA

- 3373 WEISS (EA). Bottled tea catches on in Indonesia. *World Coffee Tea*. 23(12); 1983; 20

COCOA

- 3374 RUGGERI (P), FONSECA (G) and RUGGIERI (G). Contents of theobromine and caffeine, and the occurrence of lead and cadmium, in cocoa based products. *Ind. Aliment.* 22(10); 1983; 720-22 (Italian)

The quantities of alkaloids and heavy metals present in 8 commercial cocoa products have been estimated, because of the very high consumption levels of these foods at present. The range of contents is as follows: theobromine 0.12-1.98 ppm; caffeine 0.02-0.13 ppm; lead 1.6-1.82 ppm; cadmium 0.04-0.06 ppm. Only bitter cocoa powder, consumed at the level of 100 g/cap/day is likely to provide more than the permissible amount of theobromine. KMD

BEER

- 3375 MAYER (KJ). Germany's Reinheitsgebot and brewing in the 20th century. *MBAA Techn. Q.* 20(4); 1983; 138-45

Discusses: challenge by the E.E.C.; reactions in Germany to the E.E.C. actions; Germany's official reply to the E.E.C. and the Netherland's counter measure; reputation and role of non German beers and brewers in the world; Germany's import and export problems; and the historical background of the Reinheitsgebot and its purpose. BSN

- 3376 LORENZEN (K). Resource optimization in brewing. *MBAA Techn. Q.* 20(4); 1983; 154-9

Discusses: monitoring the effluent; registration of water and energy consumption; registration of the pollution; effluent fees; saving of effluent fees; and brewer's byproducts. BSN

- 3377 SARTOR (DJ) and SHERRY (NB). Automated alcohol and original gravity analyzer: A new aid to brewing. *MBAA Techn. Q.* 20(4); 1983; 160-63

Several types of instrumentation were evaluated and the Technicon Beer Analyzer (TBA 100) was selected because of its precision, versatility, and speed of analysis. The exposure of a beer sample to a sodium perchlorate reagent produces an endothermic reaction and the temperature dependent resistance changes of a thermistor are used to measure the temperature in a reaction cell using a modified Wheat-stone bridge. AA

- 3378 KUGER (E). German beer - quality on which one can rely. *Gordian*. 83(10); 1983; 210-11 (German)

This brief note covers: a) beer production, (b) beer types, (c) beer quality, (d) the W. German and EEC regulations regarding purity, and (e) the possibilities open to the foreign brewer in the German market. KMD

- 3379 WAITES (MJ) and BAMFORTH (CW). The determination of ethanol in beer using a bioelectrochemical cell. *J. Inst. Brew.* 90(1); 1984; 33-6

A dye-linked alcohol dehydrogenase from *Rhodopseudomonas acidophila*, with a very high affinity for ethanol, has been incorporated into a bioelectrochemical cell and used for determining the concentration of ethanol

in beer. The cell measures as little as 5-25 μ g of ethanol, with a coefficient of variation of 3.1%. A wide range of beers and beer distillates have been used and the non-volatile components have been shown not to interfere with the assay. Other primary and secondary alcohols and aldehydes which are substrates for the enzyme do not contribute to the output of the cell at the concentrations in which they are normally encountered in beer. Values obtained using the cell correlate closely with those determined using a commercial test kit which incorporates a NAD-linked alcohol dehydrogenase, but results are obtained more rapidly and economically. AA

- 3380 MATSUI (S), KITABATAKI (K), TAKAHASHI (H) and MEGURO (H). Fluorometric determination of cysteine in beer by high-performance liquid chromatography with precolumn derivatisation. *J. Inst. Brew.* 90(1); 1984; 20-23

A high-performance liquid chromatographic procedure (HPLC) is described for the fluorometric determination of cysteine (CySH) in beer. Reduced CySH in beer is reacted with a fluorescent reagent, *N*-(9-acridinyl)maleimide (NAM), at pH 8.8 for 15 hours to form a stable fluorescent derivative. The resulting reaction mixture is analysed by reversed phase gradient elution HPLC. Under the optimised conditions for chromatography, 0.1 mg of CySH per litre of beer can be determined. Total CySH is determined by electrolytic reduction at a Hg pool electrode prior to the HPLC analysis. The levels of reduced and total CySH in 28 brands of commercial lager beers ranged from 0.2 to 0.9 mg/litre, and from 2.1 to 13.5 mg/litre respectively. AA

- 3381 McMURROUGH (I) and HENNIGAN (GP). Tanning properties of flavanols in barley and hops measured by reaction with cinchonine sulphate in relation to haze formation in beer. *J. Inst. Brew.* 90(1); 1984; 24-32

The flavanoid polyphenol extracts from barley and hops were each separated into six fractions by adsorption chromatography on Sephadex LH20. These fractions were further characterised by several analytical methods, including high-performance liquid chromatography and a colorimetric measurement of polymerisation index. The tanning powers of the fractions were graded according to their reactivities with cinchonine sulphate solution in a standardised turbidometric test. Whereas, almost 75% of the flavanols from *Ark Royal* barley were non-tanning oligomers, almost 96% of the flavanols from *Bullion* hops were polymeric tannins. Reactivity of most of the barley flavanols with cinchonine sulphate was increased greatly by oxidation with peroxidase and hydrogen peroxide. Some effects of polymerisation, caused by enzyme action or by exposure to air, on oxidisable polyphenols (non-tannins) were measured using (+)-catechin, procyanidin B3 and prodelphinidin B3 in model systems. These, and other measurements on experimental and commercial beers indicated that oxidation of simple flavanols from barley produced polymers with tanning properties. In contrast, the hop flavanols when extracted apparently in their native forms, were capable of co-precipitating with polypeptides in beer. Treatment of beers with different stabilising agents, such as Polyclar AT and silica hydrogel, retarded haze formation by restricting 'protein-polyphenol' interactions. AA

HOPS

- 3382 NITZ (S), MOZA (PN), KOKABI (J), FREITAG (D), BEHECHTI (A) and KORTE (F). Fate of ethylenebis (dithiocarbamates) and their metabolites during the brew process. *J. Agric. Food Chem.* 32(3); 1984; 600-603

The residues of EBD's in hops and hop extracts were 370-490 ppm and 185 ppm respectively. Ethylenethiourea (ETU) and propylenethiourea (PTU) in hops were 3 ppm and 6 ppm respectively. The wort spiked with ETU-14C was subjected

to brewing; the beer produced was found to contain more than 81% of applied amount and comprised only ETU. Stabilisers such as bentonite, polyvinylpyrrolidone and silica gels were not effective in reducing ETU levels in beer or wort. JVS

- 3383 LAWS (DRJ), MARR (JF), and VINE (PA). The storage of *yeoman* hops and pelletised powders. *J. Inst. Brew.* 90(1); 1984; 44-7

Studies have shown that on extended storage of up to 90 weeks at ambient temperature, pockets of *Yeoman* hops lose α -acids less rapidly than do the other varieties of English hops which are rich in resins. As expected, the rate of loss of α -acids is further reduced when *Yeoman* hops are stored in the cold. Pelletised powders made from *Yeoman* hops show excellent storage characteristics when commercial packs are kept for 12 months either at ambient temperature or in the cold. AA

MALT

- 3384 HENRY (RJ). A rapid method for the determination of diastatic power. *J. Inst. Brew.* 90(1); 1984; 37-9

A rapid method for the determination of diastatic power is described. The enzyme extraction and starch hydrolysis steps have been shortened to 10 minutes each and a colorimetric method involving the use of *p*-hydroxybenzoic acid hydrazide has been used for the determination of reducing sugars. The method avoids some sources of error associated with previous methods. The sensitivity of the method allows the use of small samples during it suitable for the measurement of diastatic power in barley breeding. AA

WHISKY

- 3385 RAMSAY (CM) and BERRY (DR). The effect of inoculum level on the formation of higher alcohols, fatty acids and esters in the malt whisky fermentation. *Food Microbiol.* 1(2); 1984; 111-5

In small scale whisky fermentation, the total level of higher alcohols increased with increasing inoculum level. The levels of octanoic, decanoic and dodecanoic acids and their ethyl esters were depressed at inoculum levels above 2×10^7 cells/ml. KAR

- 3386 RAMSAY (CM) and BERRY (DR). Effect of temperature and pH on the formation of higher alcohols, fatty acids and esters in the malt whisky fermentation. *Food Microbiol.* 1(2); 1984; 117-21

Neither the total higher alcohol content nor the relative abundance of different alcohols was affected by varying the temperature between 20 and 30 C. However, the level of octanoic acid, decanoic acid, ethyl hexanoate and ethyl octanoate were depressed at higher temperatures. Altering this initial pH of the wort had little effect on the level of higher alcohols. Increasing the pH from 4.0 to 7.0 resulted in an increase in the level of octanoic, decanoic and dodecanoic acids. KAR

- 3387 MAKANJUOLA (DB) and SPRINGHAM (DG). Identification of lactic acid bacterial isolated from different stages of malt whisky distillery fermentations. *J. Inst. Brew.* 90(1); 1984; 13-9

A number of strains of lactic acid bacteria were isolated and identified from samples obtained from different stages of malt whisky distillery fermentations. Isolates were subjected to a range of biochemical and physiological tests and results obtained were used to make tentative identifications.

The types of lactic acid bacteria associated with a particular stage of the fermentation are discussed. Results obtained suggest that *Leuconostoc* was the most common bacterial contaminant and tends to die off at the later stages of the fermentation. The most likely sources of bacterial contamination in the distillery are discussed. Results have shown that yeast is a very important source of contamination on an industrial scale. AA

OILS AND FATS

- 3388 WOOLLEN (A). Uses of oils and fats in Great Britain. *Cereal Food World*. 29(5); 1984; 299-300

- 3389 GRAF (E). Applications of phytic acid. *J. Am. Oil Chem. Soc.* 60(11); 1983; 1861-7

Phytic acid (myo-inositol hexaphosphate) constitutes 1-3% of most plant seeds. Its tremendous chelating potential and its effects on the absorption of polycationic nutraceuticals such as Ca^{2+} , Zn^{2+} and Fe^{3+} have been the subject of intensive investigation for several decades. Yet in the American literature there is virtually no information available on other chemical properties of phytic acid or on its beneficial utilization. This review summarizes the present medical, dental, nutritional and industrial applications of phytic acid and suggests additional novel uses for this inexpensive and easily obtained chemical. AA

OILS

- 3390 YU (LZ), INOKO (M) and MATSUNO (T). A gas chromatographic method for rapid determination of food additives in vegetable oils. *J. Agric. Food Chem.* 32(3); 1984; 681-3

High resolution GC with a fused silica capillary column has been used for the simultaneous determination of five food additives, namely, DHA, BHA, BHT, TBHQ, and Irganox-100 in vegetable oils. JVS

- 3391 DZIEDZIC (SZ) and HUDSON (BJF). Phenolic acids and related compounds as antioxidants for edible oils. *Food Chem.* 14(1); 1984; 45-51

Of the different phenolic acids, cinnamic acids are more effective than corresponding benzoic acids, and phenylacetic and phenylpropionic acids are even more effective. 3,4-dihydroxychalcone is more effective than the analogous caffeic acid. In general, the presence of a carbonyl group in the molecule appears to be necessary in this series for a high level of antioxidant activity. KAR

BRASSICA

- 3392 HORN (PJ) and VAUGHAN (JG). Seed glucosinolates of fourteen wild *Brassica* species. *Phytochemistry*. 22(2); 1983; 465-70

GROUNDNUT OIL

- 3393 ANON. Triacylglycerol structure and the atherogenicity of peanut oil. *Nutr. Rev.* 41(10); 1983; 322-3

CANOLA SEED OIL

- 3394 DAUN (JK). Composition and use of canola seed oil and meal. *Cereal Food World*. 29(5); 1984; 291-4, 296

Review. Canola, the latest oilseed in the world was developed from rapeseed (*Brassica napus* L. and *Br. campestris*). It is characterised by low levels of both erucic acid and glucosinolates. The properties, uses and trade of canola are discussed. Three tables provide data on oil and protein contents of canola, its fatty acid composition and also physical properties. JVS

KARAKA SEED OIL

- 3395 BODY (DR). The lipid composition of karaka seeds (*Corynocapus laevigatus*). *J. Am. Oil Chem. Soc.* 60(11); 1983; 1894-5

The kernels of karaka seeds (*Corynocapus laevigatus*) contained 9.6% oil by weight. The lipid constituents were characterized by silicic acid column chromatography and thin layer chromatography, and their individual fatty acid compositions by gas liquid chromatography. Of the seed oil, triacylglycerol was the major component which contained high proportions of linoleic (45%) and oleic (26%) acids. The major components of husk oil (0.9% of husk by weight) was polar lipid (glycolipids and pigments). AA

SUNFLOWER OIL

- 3396 MILLAN (F), VIOQUE (E) and MAZA (MP). Study of the neutral lipids of sunflower meal and isolates. *J. Am. Oil Chem. Soc.* 60(7); 1983; 1321-5

FATS

- 3397 MIETH (G), ELSNER (A), BRUCKNER (J), WEISS (A) and BEHRENS (H). A caloric compounds with fat-like functional properties (pseudofats). *Nahrung*. 27(9); 1983; 853-76 (German)

The review deals with synthesis, characterization, physicochemical and physiological properties with respect to nutrition of acaloric fat-like compounds (pseudofats) with special regard to fatty acid esters of sucrose, glycerol ethers and glycerol dicarbonic acid esters. Furthermore, an outlook is given of other classes of compounds that are potentially suited to substitute fat as for instance polycarbonic acid-, polyglycerol-, and polyglycol derivatives. AA

SPICES AND CONDIMENTS

FENUGREEK

- 3398 EL-SHIMI (NM), DAMIR (AA) and RAGAB (M). Changes in some nutrients of fenugreek seeds during germination. *Food Chem.* 14(1); 1984; 11-9

During germination, the starch content decreased and total sugar content increased. Ascorbic acid and total and protein nitrogen also increased

during germination. The amino acid contents decreased slightly after soaking and thus increased during sprouting. Sprouting resulted in the loss of phytic acid with simultaneous increase of phytic acid contents. Calcium, manganese and zinc were increased after 4 days of sprouting. The iron and potassium contents decreased during germination without any apparent changes in magnesium content. KAR

HORSERADISH

- 3399 MAZZA (G). Volatiles in distillates of fresh, dehydrated and freeze dried horseradish. *Can. Inst. Food Sci. Technol. J.* 17(1); 1984; 18-23

SENSORY EVALUATION

- 3400 KING (NL) and JONES (PN). Analysing Warner-Bratzler curves. *J. Texture Stud.* 14(3); 1983; 283-301

Forces required to deform and rupture samples of meat were measured in a modified Warner-Bratzler device. A model is proposed to describe the shape of the plot of force against distance. This model was fitted by a least squares method to experimental curves obtained from (1) bovine longissimus dorsi muscles aged at 15 C for 1-7 days and then cooked at 80 C for 4 hours and (2) bovine biceps femoris muscles conditioned at 15 C for 24 hours and then cooked at 80 C for 1-22 hours. A plot of the variance between replicate forces, as a function of distance, exhibits two prominent peaks, one of which is thought to be associated with rupturing of fibre bundles, and the other with rupturing of perimysial connective tissue. Parameters calculated by fitting the model to replicate curves indicate that muscle fibres rupture in groups of fibre bundles. Hence, contrary to previous interpretations, initial yield involves rupture of connective tissue, as well as myofibrils. However, the number of fibre bundles forming a group capable of independent rupture varies according to the time-temperature history of the sample, as do other parameters. The model permit relative contributions of fibre bundles and perimysial connective tissue to be estimated. In the samples studied here, perimysial connective tissue offered greater resistance to passage of the blade than did the fibre bundles. AA

- 3401 McBRIDE (RL), WATSON (AJ) and COX (BM). The paired-comparison method as a simple difference test. *J. Food Quality.* 6(4); 1984; 285-90

The paired-comparison method is rarely used as a simple difference test in sensory analysis because it lacks a predictable null hypothesis. However, two separate experiments with a total of 810 assessors both provided empirical support for a probability under the null hypothesis of $p = \frac{1}{2}$, but showed also that this probability can be influenced by the way in which the difference question is asked. AA

FOOD STORAGE

- 3402 BANKS (HJ), LONGSTAFF (RA), RAUPACH (MR) and FINNIGAN (JJ). Wind-induced pressure distribution on a large grain storage shed: Prediction of wind-driven ventilation rates. *J. Stored Prod. Res.* 19(4); 1983; 181-8

The wind-induced pressure distribution over a typical, large grain storage shed (rectangular low rise building, 30° pitched roof) is presented for different wind orientations. The distribution was determined from a wind tunnel model study using a simulated atmospheric boundary layer. The overall pattern was similar to that expected, showing, in particular, a prominent leeward vortex for some wind incidence angles. As an example of the use of the pressure distribution data in ventilation modelling and design studies, the ventilation rate was calculated for three different dispositions of vent in the storage. Two of these incorporated rectangular vents in the roof; the third being the common open eave vent system. The three dispositions investigated gave similar calculated ventilation rates showing that, for an equal area of vent, the open eave system could be replaced by suitably placed and more easily sealed rectangular vents. AA

- 3403 BOWDEN (PJ). Comparison of three routine oven methods for grain moisture content determination. *J. Stored Prod. Res.* 20(2); 1984; 97-106

INFESTATION CONTROL AND PESTICIDES

- 3404 HODGES (RJ). Stored products pests and remote moisture sensors. *J. Stored Prod. Res.* 19(4); 1983; 203-8

- 3405 EVANS (DE). The influence of relative humidity and thermal acclimation on the survival of adult grain beetles in cooled grain. *J. Stored Prod. Res.* 19(4); 1983; 173-80

The influence of humidity and thermal acclimation on the survival of *Cryptolestes ferrugineus*, *Oryzaephilus surinamensis*, *Rhyzopertha dominica*, *Sitophilus granarius*, *S. oryzae* and *Tribolium castaneum* in cooled wheat or flour at 45 and 70% relative humidity was studied in the laboratory. Young adults were held continuously at 30 or 32 C; cooled gradually to 13.5 C and held at that temperature; cooled gradually to 9 C and held at that temperature; or transferred directly to 9 C. Survival at low temperatures differed, often considerably, between species being generally shortest in *T. castaneum* (0.7-16 weeks) and longest in *S. granarius* (5-40 weeks). There was considerable interaction between the effects of temperature and humidity, with survival being, to varying degrees, shorter in 45% r.h. than in 70% r.h. At 45% r.h., an equilibrium relative humidity common in Australian storages, all species survived when the grain was cooled to 13.5 C, but only *S. granarius* survived 26 weeks in grain cooled to 9 C. Chill-coma temperature and acclimation temperature were linearly related in all species at each humidity. Neither the slopes nor intercepts of the relationship were influenced by humidity. There was generally an inverse relationship between survival and chill-coma temperature. At 45% r.h., the increase in survival at 9 C attributable to acclimation ranged from 2-fold in *S. oryzae* (0.9 weeks) to 3.5-fold in *C. ferrugineus* (3.8 weeks). Corresponding values for beetles at 70% r.h. ranged from 2.3-fold in *R. dominica* (2.4 weeks) to 7.9-fold in *C. ferrugineus* (6.9 weeks). AA

- 3406 BELL (CH). Effect of high temperatures on larvae of *Ephestia utella* (Lepidoptera: pyralidae) in diapause. *J. Stored Prod. Res.* 19(4); 1983; 153-7

- 3407 WILSON (P). Insect infestation and pesticide usage in East Anglian farm grain stores. *Int. Pest. Control.* 25(4); 1983; 116-8

The investigation concerns out breaks of grain infestation as monitored, by bait traps of 129 grain stores in cambridgeshire, Norfolk and suffolk over a period of two years. The incidence of infestation by insects did not shown any significant change since 1977. It has been suggested that more effort is needed to promote good grain and grain store management to prevent losses. BSN

- 3408 SHADDUCK (JA). Some considerations on the safety evaluation of nonviral microbial pesticides. *Bull. World Health Organ.* 60(1); 1983; 117-28
- 3409 DIKSHIT (A), DUBEY (NK), TRIPATHI (NN) and DIXIT (SN). Cedrus oil - A promising storage fungitoxicant. *J. Stored Prod. Res.* 19(4); 1983; 159-62
- 3410 GONSIOR (SJ), BAILEY (RE), RHINEHART (WL) and SPENCE (MW). Biodegradation of O-phenylphenol in river water and activated sludge. *J. Agric. Food Chem.* 32(3); 1984; 593-6
- OPP is extensively used in disinfectant formulations and also as a fungicide in fruit packing industry. The present study showed that 50% of (¹⁴C)OPP reduced in one week from river water, in 24 hours from nonacclimated sludge and 3 hours in acclimated sludge. JVS
- 3411 WOOD (RJ) and COOK (LM). A note on estimating selection pressures on insecticide-resistance genes. *Bull. World Health Organ.* 60(1); 1983; 129-34
- 3412 JAGLAN (PS) and ARNOLD (TS). Metabolism of the insecticidal carbamate methyl N (((((1,1-dimethylethyl) (5,5-dimethyl-2-thioxo-1,3,2-dioxaphosphorinan-2-yl)-amino)thio)methylamino)carbonyl)oxy)ethanimidothioate in rats. *J. Agric. Food Chem.* 32(3); 1984; 618-22
- In the present study, the absorption, excretion and metabolism of ¹⁴C-labelled 1 was studied in rat as part of a program to aid toxicologists to evaluate the safety of this insecticide. JVS
- 3413 DING (X-D) and KRULL (IS). Trace analysis for organothiophosphate agricultural chemicals by high-performance liquid chromatography-photolysis-electrochemical detection. *J. Agric. Food Chem.* 32(3); 1984; 622-8
- The approach of HPLC-photolysis and electrochemical detection has been used for about 20 different thiophosphates. It was found reproducible and reliable. JVS

BIOCHEMISTRY AND NUTRITION

- 3414 ANON. Taste of salt on a low sodium diet. *Nutr. Rev.* 41(9); 1983; 274-6
- 3415 VAN DORT (HM), VAN DER LINDE (LM) and De RIJKE (D). Identification and synthesis of new odour compounds from photolysis of thiamine. *J. Agric. Food Chem.* 32(3); 1984; 454-7
- Four new odour compounds are formed by the photolysis of thiamine hydrochloride. Their chemical identity, spectral data, odour thresholds, and odour descriptions have been given. A path way for the possible formation of this compound has also been given. JVS
- 3416 CHERRY (JP). Collaborative study on the protein dispersibility index. *Cereal Food World.* 29(5); 1984; 327-8

- 3417 PRACROS (P), LESSARD (FF) and CONAN (L). The early classification of the nutritional value of protein sources by biological tests using two insects found in stored foodstuffs of the *Tenebrionidae* family: *Tenebrio molitor* L. and *Tribolium confusum* Duval. *Qualitas plantarum*. 33(2-3); 1983; 215-20
Biological assays on white rats and chickens used to screen the nutritional value of plant proteins, are compared with those of yellow mealworm (*Tenebrio molitor* L.) and confused flour beetle (*Tribolium confusum* Duval). With the twenty diets tested, the classification by vertebrates and insect larvae was largely similar. AA
- 3418 BEATON (GH). Energy in human nutrition: Perspectives and problems. *Nutr. Rev.* 41(11); 1983; 325-40
Discusses: estimation of the magnitude of the nutrition problem; macroanalyses of the adequacy of energy intake; additional criticism and alternatives; relationship between intake and function and a reconceptualization of energy requirement. BSN
- 3419 FINOCCHIARO (ET) and RICHARDSON (T). Sterol oxides in foodstuffs: A review. *J. Food Prot.* 46(10); 1983; 917-25
Dietary sterol oxides in several food stuffs were examined with particular emphasis on their isolation and characterisation techniques. Besides eight common oxidation products of cholesterol in certain cholesterol rich foods, four common autooxidation products of β -sitosterol have been identified in edible oils. The nutritional significance of these compounds in human dietary has been discussed. BSN
- 3420 SAUTIER (C), DIENG (K), FLAMENT (C), DOUCET (C) and LEMONNIER (D). The influence of four dietary proteins and sodium phytate on the metabolism of cholesterol and the lipoproteins in rat. *Qualitas Plantarum*. 33(2-3); 1983; 193-9
- 3421 SABRY (JH), CHOROSTECKI (DJ) and WOOLCOTT (DM). Characteristics of daily food patterns containing different levels of fat. *Can. Inst. Food Sci. Technol. J.* 17(1); 1984; 28-32
- 3422 THOMPSON (HJ). Selenium as an anticarcinogen. *J. Agric. Food Chem.* 32(3); 1984; 422-5
During the last 25 years, attention has been shifted to the role played by selenium in physiological processes as a dietary component of humans and animals. Evidence has been presented here that selenium acts as a chemopreventive agent against mammary carcinogenesis. An over view of the inhibition of experimental breast cancer (rat/mice studies) and the effects of selenium on process of initiation have also been presented. JVS
- 3423 MARTIN (SE) and SCHILLACI (M). Inhibitory effects of selenium on mutagenicity. *J. Agric. Food Chem.* 32(3); 1984; 426-33
- 3424 MILNER (JA). Selenium and the transplantable tumor. *J. Agric. Food Chem.* 32(3); 1984; 436-42
- 3425 CHOW (CK) and GAIROLA (GC). Influence of dietary vitamin E and selenium on metabolic activation of chemicals to mutagens. *J. Agric. Food Chem.* 32(3); 1984; 443-7
When rats were fed a basal vitamin E (VE) deficient and low-selenium (Se) diet with or without 100 ppm of VE or 2 ppm of Se supplementation, the ability of liver S-9s to mutagenically activate benzo(a)pyrene (BP)

was not appreciably altered, although differences in the activation of 2-aminofluorene and 2-aminoanthracene were observed. Aroclor treatment caused a reduction in the mutagenic activation of aryl amines in all dietary groups while a distinct increase in BP activation was seen. The activity of aryl hydrocarbon hydroxylase was significantly higher in the liver S-9s of VE- and Se-supplemented rats and was markedly increased in all dietary groups as a result of Aroclor treatment. Hepatic GSH S-transferase activity but not the Se-dependent GSH peroxidase activity was increased following Aroclor treatment. The results do not suggest a direct relationship between the enzymatic alterations caused by dietary antioxidants and the ability of hepatic S-9s to mutagenically activate procarcinogens. AA

TOXICOLOGY AND HYGIENE

- 3426 GARCIA ROCHE (M), BALLEÑILLA (T), CASTILLO (A), SILVA (V) and CABRERA (Y). The toxicity of the daily intake of nitrite and dimethylamine. *Nahrung*. 27(9); 1983; 837-41

It is known that sodium nitrite and dimethylamine are toxic compounds, which may react to form dimethyl-nitrosamine in the gastro-intestinal tract, a much more toxic compound and a powerful cancerogen. The indicators examined were: histopathological analysis of the liver and kidney, transamines in blood serum, variations in body weight and relation of weight liver/body weight. The method of analysis used to determine transaminase was that reported by Reintman and Frankel in 1957. The statistical method employed, was the test of multiple comparisons based on the total ranges of Cruskal-Wallis. The results show that either significant differences were found ($\alpha = 0.05$) among the groups (including the control), nor was necrosis observed or forming of tumors in the organs under investigation. Therefore, the dosis administered does not seem to be toxic under the conditions of the experiment. Some signs of toxicity found in the group which was more severely treated (10 mg of sodium nitrite and 20 mg of dimethylamine) appeared only in a few animals and it is necessary to verify the same in experiments with more animals and over a longer period of treatment. AA

- 3427 SHARPE (AN), RAYMAN (MK), BURGNER (DM), CONLEY (D), LOIT (A), MILLING (M), PETERKIN (PI), PURVIS (U) and MALCOLM (S). Collaborative study of the MPN, Anderson Baird-Parker direct plating, and hydrophobic grid-membrane filter methods for the enumeration of *Escherichia coli* biotype I in foods. *Can. J. Microbiol.* 29(10); 1983; 1247-52

Five Health Protection Branch laboratories compared two membrane filter methods (the Anderson-Baird-Parker direct plating, and a hydrophobic grid-membrane filter method) against the most probable number procedure (MPN) for enumerating *Escherichia coli* biotype I in foods. Results were available in 24 hours by both membrane filter methods, compared with 10-14 days by the MPN procedure. For ground beef, Parmesan cheese, and cut green beans, the hydrophobic grid method generally gave the highest recovery, although the two membrane filter methods were not significantly different. Both these methods gave significantly higher recoveries than the MPN procedure, and for most foods, either method would be preferable. Further work is required before either membrane filter method can be recommended for bean and alfalfa sprouts, which may contain very high levels of *Klebsiella* spp. AA

- 3428 BERSANI (C), CASATI (E) and CANTONI (C). Research on *Yersinia* in foods. *Ind. Aliment.* 22(10); 1983; 749-53 (Italian)

Fourteen strains of *Yersinia* have been detected in 347 randomly selected food samples. The sero-types that were isolated include 6 strains of *Y. intermedia* and 4 strains of *Y. enterocolitica* from thawed imported meat; 2 strains of *Y. enterocolitica* and 1 strain of *Y. intermedia* from vegetables; 1 strain from altered raw ham; and 1 strain from chicken. No *Yersinia* was isolated from 29 samples of pig's tonsils. KMD

- 3429 CHOPRA (AK) and MATHUR (DK). Factors affecting protease production by *Bacillus stearothermophilus* RM-67. *J. Food Prot.* 46(12); 1983; 1020-25
- 3430 EL-ZAYAT (AI), OMAR (MM), EL-NESHAWY (AA) and ASHOUR (M). Effect of disinfectants on the proteolytic activity of *Bacillus subtilis*. *Chem. Mikrobiol. Technol. Lebensmittel.* 8(2); 1983; 57-9
- 3431 FOEGEDING (PM) and BUSTA (FF). Effect of carbon dioxide, nitrogen and hydrogen gases on germination of *Clostridium botulinum* spores. *J. Food Prot.* 46(11); 1983; 987-9
- 3432 STELMA (GN) Jr., WIMSATT (JC), KAUFFMAN (PE) and SHAH (DB). Radioimmunoassay for *Clostridium perfringens* enterotoxin and its use in screening isolates implicated in food poisoning outbreaks. *J. Food Prot.* 46(12); 1983; 1069-73
- 3433 SCHEUBER (PH), MOSSMANN (H), BECK (G) and HAMMER (DK). Direct skin test in highly sensitized Guinea pigs for rapid and sensitive determination of staphylococcal enterotoxin B. *Appl. Environ. Microbiol.* 46(6); 1983; 1351-6
- 3434 IKEGWUONU (FI). The neurotoxicity of aflatoxin B₁ in the rat. *Toxicology.* 28(3); 1983; 247-59
- 3435 DORNER (JW). Production of cyclopiazonic acid by *Aspergillus tamarii* Kita. *Appl. Environ. Microbiol.* 46(6); 1983; 1435-7
 Production of the mycotoxin cyclopiazonic acid by *Aspergillus tamarii* Kita is reported for the first time. Examination of 23 isolates of the fungus showed that 22 produced the toxin under the culture conditions utilized. AA
- 3436 BULLERMAN (LB). Effects of potassium sorbate on growth and aflatoxin production by *Aspergillus parasiticus* and *Aspergillus flavus*. *J. Food Prot.* 46(11) 1983; 940-42, 946
 Growth and aflatoxin production by selected strains of *Aspergillus parasiticus* and *Aspergillus flavus* in the presence of potassium sorbate at 12 C were studied. Potassium sorbate at 0.05, 0.10 and 0.15% delayed or prevented spore germination and initiation of growth, and slowed growth of these organisms in yeast-extract sucrose broth at 12 C. Increasing concentrations of sorbate caused more variation in the amount of total mycelial growth and generally resulted in a decrease in total mycelial mass. Potassium sorbate also greatly reduced or prevented production of aflatoxin B₁ by *A. parasiticus* and *A. flavus* for up to 70 days at 12 C. At 0.10 and 0.15% of sorbate, aflatoxin production was essentially eliminated. A 0.05% sorbate, aflatoxin production was greatly decreased in *A. flavus* over the control, but only slightly decreased in *A. parasiticus*. AA
- 3437 FRISVAD (JC) and FILTENBORG (O). Classification of terverticillate Penicillia based on profiles of mycotoxins and other secondary metabolites. *Appl. Environ. Microbiol.* 46(6); 1983; 1301-10

- 3438 WINSLOW (RL). The retail food store sanitation code. An update. *Dairy Food Sanit.* 3(12); 1983; 454-7
Discusses: background; implementation; updating; benefits; and future revisions. BSN
- 3439 EYLES (MJ). Transmission of viral disease by food. *CSIRO Food Res. Q.* 43(3); 1983; 51-6
The review covers viruses transmitted by food; viral contamination of food; and incidence of food-borne viral disease. KAR

GENERAL

- 3440 GOPALAKRISHNAN (CA), KRISHNAMURTHI (N) and VISWANATHAN (MR). Importance of organic wastes. *Poult. Guide.* 21(5); 1983; 51-4

FOOD PROCESSING AND PACKAGING

PROCESSING

- 3441 VEENA JAIN and SINGH (TR). Perceived attributes of food preservation practices by farm women. *Indian J. Nutr. Dietet.* 20(6); 1983; 195-201
- 3442 AMERIO (M). Extrusion: Modern method for the foodstuffs treatment. *Ind. Aliment.* 22(12); 1983; 921-4 (Italian)

PACKAGING

- 3443 ANON. CEKACAN - Breakthrough in the market for metal plate and helical cans. *Gordian.* 83(11); 1983; 236-7 (German)
- The CEKACAN packaging system consists of a method for the manufacture of helical cans made of cardboard lined with aluminium and polyethylene. An outline of the procedure and a flow diagram have been given. KMD

FOOD ENGINEERING AND EQUIPMENT

- 3444 WALTHER (H). Refrigeration engineering for the food production. *Lebensmittel-industrie.* 30(8); 1983; 347-8 (German)
- 3445 WITTIG (R). Experience with the programmable mini-computer K 1003. *Lebensmittelindustrie.* 30(8); 1983; 343-6 (German)
- The structure and mode of operation of the programmable mini-computer K 1003 have been explained. The facility of use of this machine is pointed out, and its applicability for the solution of the many-sided problems arising in factory management has been demonstrated. KMD

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

- 3446 HIROSUE (T), KAWAI (H) and HOSOGAI (Y). Determination of thiocyanate (SCN) in food by gas chromatography with electron-capture detector. *J. Jpn. Soc. Food Sci. Technol.* 30(5); 1983; 296-9 (Japanese)
- Thiocyanate contents were determined for vegetables (33 samples),

fruits (9 samples), fungi (3 samples) and spices (2 samples) by GC with electron-capture detector (ECD-GC). The recoveries of thiocyanate added to cabbage were in the range of 92~95%. It was found that most of foods tested contained thiocyanate. The thiocyanate contents determined by ECD-GC were n.d.~2 424.34 ppm (dry weight) in vegetables, n.d.~41.93 ppm (dry weight) in fruits, 9.60~100.67 ppm (dry weight) in fungi and 10.70~785.09 ppm in spices. AA

- 3447 SEKIGUCHI (M). Gas chromatographic method for measurement of water activity in the presence of volatiles. *J. Jpn. Soc. Food Sci. Technol.* 30(5); 1983; 257-63 (Japanese)

A gas chromatographic technique was investigated in order to determine water activities and equilibrium ethyl alcohol vapour concentrations correctly, in the presence of volatiles, without opening packages. Head-space gases of samples were analyzed, using a gas chromatograph equipped with TCD. Porapak S (Waters Ltd.) column and gas sampling device whose temperature was controlled. Water activities and equilibrium ethyl alcohol vapour concentrations were calculated from the contents of air, water and ethyl alcohol vapour. It was important to keep the temperature constant for precise results. The flexible containers which were suitable for measurements were prepared. Standard deviations in measurements of a sponge cake to which ethyl alcohol was added were as follows: water activity - 0.004 (C.V. 0.5%), equilibrium ethyl alcohol vapour concentration - 0.008% (C.V. 1.0%). AA

FOOD LAWS AND REGULATIONS

Nil

FOOD MICROBIOLOGY

- 3448 HEATH (G) and LIGUGNANA (R). Rapid microbiological control of food by impedimetry. *Ind. Aliment.* 22(12); 1983; 962-6 (Italian)

Microorganisms are automatically detected by monitoring the changes in conductivity caused by their growth in nutrient media. The metabolism of growing cultures produces small changes in conductance which are a reliable measure of the population growth. A combination of high resolution conductance measurements and stable incubation temperatures enable growth to be detected soon after inoculation of the medium. Total viable counts can be estimated within a few hours, rather than in a day or more required by most conventional techniques. Data can be collected, stored, and processed sequentially in the system's own mini-computer and displayed on a visual display unit, printer, or chart recorder. KMD

- 3449 ZAVANELLA (M), NIGRELLI (D), TAGLIABUE (S) and MANCINI (A). A micromethod for bacterial count in foods. *Ind. Aliment.* 22(12); 1983; 940-44 (Italian)

The use of a tissue culture square polystyrene dish with 25 compartments adapted for enumeration of mesophilic bacteria, coliform, staphylococci, enterococci and anaerobes in food is described. The inexpensive, simple method showed an acceptable degree of correlation with the standard plate count technique. AA

ENZYME

- 3450 SAHIN (I), DONMEZ (S) and KILIC (O). Study on pectolytic enzyme production from some agricultural wastes by some fungi. *Chem. Mikrobiol. Technol. Lebensm.* 8(3); 1983; 87-90

In this study, the possibilities of pectolytic enzyme production from some agricultural wastes by some fungi were studied. Sunflower torus was used as energy source with glucose. The results indicated that sunflower torus could be used satisfactorily in pectolytic enzyme production. Some *Aspergillus niger* strains produced 3,91-5,12 g enzyme/100 g raw material and the pectinesterase and polygalacturonase activities of enzymes produced were almost the same compared with the commercial pectolytic enzyme prepareate "Ultrazym 100 special". AA

CELLULASE

- 3451 KUMAKURA (M), KAETSU (I) and NISIZAWA (K). Cellulase production from immobilized growing cell composites prepared by radiation polymerization. *Biotechnol. Bioeng.* 26(1); 1984; 17-21

GLUCOAMYLASE

- 3452 JACH (M) and SUGIER (H). Adsorption of glucoamylase on DEAE-cellulose. *Starch.* 35(12); 1983; 427-30

FERMENTATION

- 3453 ZAHN (G), KERSTEN (R), SCHADE (W) and WESENBERG (J). The importance of serologic methods for the differentiation of yeasts in the fermentation and beverage industry. *Lebensmittelindustrie.* 30(9); 1983; 411-14 (German)
- 3454 WOODROW (J) and SPEAR (K). The use of derivative spectrophotometry for the rapid measurement of substrate and product concentration in fermentation. *Appl. Microbiol. Biotechnol.* 19(3); 1984; 177-80

Derivative spectrophotometry has been used to study the culture of *Pseudomonas fluorescens* NCIB 11615 grown in complex medium containing acetonitrile. By using fourth derivative spectra, it has proved possible to determine both acetanilide (substrate) and aniline (product) concentration in culture samples. KAR

ETHANOL

- 3455 SCHELTER GRAF (A), HUCK (H) and SCHMIDT (H-L). A rapid and accurate determination of ethanol using an oxidase electrode in a flow injection system. *Z. Lebensmittel Unters Forsch.* 177(5); 1983; 356-8 (German)

An alcohol oxidase electrode - without chemical immobilization of the enzyme - has been constructed for the rapid determination of ethanol in beverages. A layer of cigarette paper impregnated with a 20%-alcohol oxidase solution was mounted onto a Clark oxygen electrode and covered by a dialysis membrane. The half life of the entrapped enzyme was 6.5 days. The electrode is part of a flow system, into which the samples are injected. Alcohol determinations were carried out with tenfold diluted beer samples, and the results were in good agreement with those obtained by refractometric alcohol analysis. AA

- 3456 RYU (DDY), KIM (YJ) and KIM (JH). Effect of air supplement on the performance of continuous ethanol fermentation system. *Biotechnol. Bioeng.* 26(1); 1984; 12-6

TOFU

- 3457 WANG (HWL). *Tofu* and *tempeh* as potential protein sources in the Western diet. *J. Am. Oil Chem. Soc.* 61(3); 1984; 528-34
- The production and consumption of *Tofu* has been increasing in USA even outside oriental communities. *Tempeh* is also becoming a hamburger alternative for vegetarians who number 10-15 millions in USA. Brief description of *Tofu* and *Tempeh* as also their characteristic features has been provided. JVS

PEDIOCOCCUS

- 3458 TANASUPAWAT (S) and DAENG SUBHA (W). *Pediococcus* species and related bacteria found in fermented foods and related materials in Thailand. *J. Gen. Appl. Microbiol.* 29(6); 1983; 487-506

Tetrad-forming cocci were isolated from 17 kinds of fermented fish, meat, vegetables, and other materials in Thailand. Out of 58 strains identified, 22 were *Pediococcus pentosaceus* Mees, 2 were *Pedicoccus acidilactici* Lindner, 26 were *Pediococcus halophilus* Mees, 4 were *Pediococcus* sp., and 4 were *Tetracoccus* sp. They were widely distributed in fermented products in Thailand, and play roles in souring and ripening. AA

ASPERGILLUS NIGER

- 3459 ILCZUK (Z), FIEDUREK (J) and PASZCZYNSKI (A). Intensification of amylase synthesis with *Aspergillus niger* by way of multi-stage mutagenization. *Starch.* 35(11); 1983; 397-400

In all, 378 mutants of *Aspergillus niger* were isolated and initially evaluated for total amylolytic activity by the method of test-tube microculture. Nine most active mutants were then tested in submerged culture, whereby the activity of glucoamylase and α -amylase in the post-culture liquid was determined. The activity of α -amylase was found to increase from about 7 to nearly 31%, that of glycoamylase from 4 to over 61%. KMD

POLYPORUS DURUS

- 3460 DRAWERT (F), BERGER (RG) and NEUHAUSER (K). Biosynthesis of flavour compounds by microorganisms. 5. Lactones in cultures of *Polyporus durus*. *Chem. Mikrobiol. Technol. Lebensm.* 8(3); 1983; 91-2 (German)

When growing in a synthetic liquid nutrient broth, the basidiomycete *Polyporus durus* has an intensive aromatic - fruity odour, resembling coconut. Among the volatile metabolites - identified by gas chromatography, coupled gas chromatography-mass spectrometry and sniffing analysis, γ - γ -octalactone is the main compound (7,4 mg/l); other volatiles like γ -hexalactone, γ -heptalactone and a number of not identified compounds with γ -lactone character occurred in smaller amounts. AA

MUSHROOM

- 3461 HANSSEN (H-P) and KLINGENBERG (A). Determination of some important flavour compounds in commercial mushroom concentrates. *Z. Lebensmittel Unters. Forsch.* 177(5); 1983; 333-5

The contents of some important flavour components (1-octen-3-ol and 1-octen-3-one, L-glutamic acid, guanosine-5'-monophosphate, GMP) were determined in 12 commercial mushroom concentrates obtained from seven European manufacturers. The 12 samples investigated showed significant differences in composition and contents of volatile flavour components, as well as different contents of the nonvolatile flavour compounds, L-glutamic acid and GMP. AA

DIPODASCUS MAGNUSII

- 3462 FISCHER (K-H), SENSER (F) and GROSCH (W). Formation of flavours by microorganisms. Production of fruit esters in cultures of the yeast *Dipodascus magnusii*. *Z. Lebensmittel Unters. Forsch.* 177(5); 1983; 336-8 (German)

The yeast *Dipodascus magnusii* when growing in a nutrient broth, containing glucose, produces an intensive and pleasing fruity aroma. Isobutyl acetate and the ethyl esters of acetic-, 2-methylpropionic-, butyric- and 2- and 3-methylbutyric acid are responsible for this aroma-impression. These compounds have been identified by means of capillary gas chromatography, (GC)² and (GC)²/MS. The concentration of the ethanol produced is 1,2-2,0 g/l which is relatively low. AA

SINGLE CELL PROTEIN

- 3463 VRATI (S). Single cell protein production by photosynthetic bacteria grown on the clarified effluents of biogas plant. *Appl. Microbiol. Biotechnol.* 19(3); 1984; 199-202

Attempt has been made to produce single cell protein in the clarified supernatant of cow dung, Single cell protein from different photosynthetic bacteria, grown on clarified supernatant, was found to be rich in essential amino acids. *Rhodospseudomonas capsulata* produced the best single cell protein. KAR

FOOD ADDITIVES

- 3464 UENO (S), OYAMADA (N), KUBOTA (K), KUROSAWA (K) and ISHIZAKI (M). The spore rec-assay of food additives from natural origin. *J. Jpn. Soc. Food Sci. Technol.* 30(3); 1983; 172-4 (Japanese)

The rec-assay using spores of *Bacillus subtilis* strains, H17 Rec⁺ and M45 Rec⁻, was carried out on food additives from natural origin. For metabolic activation, 9,000 x g supernatant solution of the liver homogenate of Sprague-Dawley male rat previously treated with phenobarbital and 5,6-benzoflavone was used. Nine tested samples were all negative in the spore rec-assays with and without metabolic activation. Among nine samples, hop oil and garlic oil showed slightly inhibitory effects against *B. subtilis*. AA

CURCUMA DYE

- 3465 TONNESEN (HH) and KARLSEN (J). Quantitative determination of curcuma dyes in food. *Z. Lebensmittel Unters. Forsch.* 177(5); 1983; 348-9 (German)

A method for the quantitative determination of curcuma dyes in food has been developed. The curcuminoids were extracted with methanol and separated by HPLC. Spectrophotometric or fluorimetric detection was used for quantitation. The reproducibility of the method was good. AA

NEOPURPURATIN

- 3466 IMADA (K), OHSHIMA (M), YOSHIDA (T), YASUDA (S) and YOSHINO (S). Evaluation of neopurpuratin, a purplish-red substance produced by microorganism, as food colours. *J. Jpn. Soc. Food Sci. Technol.* 30(5); 1983; 270-75 (Japanese)

GUAR GUM

- 3467 VARTIAINEN (T) and GYNTHNER (J). Fluoroacetic acid in guar gum. *Food Chem. Toxicol.* 22(4); 1984; 307-8

Fluoroacetic acid, a very toxic compound has been detected in some samples of guar gum at levels of 0.07-1.42 mcg/g. Since the levels are low, consideration of possible health risks is reported to be dispelled. JVS

ASPARTAME

- 3468 HUSSEIN (MM), DIAMELIA (RP), MANZ (AL), JACIN (H) and CHEN (WTC). Determination of reactivity of aspartame with flavour aldehydes by gas chromatography, HPLC and GPC. *J. Food Sci.* 49(2); 1984; 520-24

The reactivity of aspartame with several aldehydes in ethanol was determined by gas chromatographic analysis of the reacted aldehyde. The model aldehydes were benzaldehyde, cinnamaldehyde, citral, n-decanal, and vanillin. The data showed that Aspartame is quite reactive with the aldehydes, although the reactivity differed with each. Detection of and analysis for the reaction products were done by HPLC and GPC. Molecular weights of cinnamaldehyde-aspartame and benzaldehyde-aspartame reaction products were determined by GPC. The reactivity is dependent on the relative concentrations of the reactants. It is also influenced by the reaction medium. AA

GLYCOSYL SUCROSE

- 3469 MANABE (M) and NISHII (H). Effect of glycosyl sucrose on gel formation of pectin jelly. *J. Jpn. Soc. Food Sci. Technol.* 30(3); 1983; 162-7 (Japanese)

Glycosyl sucrose (GS), or sucrose coupled starch syrup, is a natural sweetener with a low-carcinogenicity, obtainable by subjecting a mixture of solution of starch and sucrose to the transfer action of cyclodextrin glucanotransferase (EC 2.4.1.19). The application of GS to pectin jelly and its stability were studied. The use of GS in high methoxyl pectin (HMP) jelly of either rapid- or slow-set pectin gave satisfactory gel strength.

In a model experiment using 65% GS or sucrose and 0.75~1.0% pectin, the pH required to obtain satisfactory gel strength in the rapid- or slow-set pectin jelly with the use of GS was about 3.2~3.5, while it was slightly lower when sucrose was used. In low methoxyl pectin (LMP) jelly, satisfactory gel strength was obtained with 30% of GS, pH 3.8, and Ca^{2+} concentration of 25 mg/g pectin. LMP gel formation with GS was much more easier than that attained with sucrose at lower concentrations of Ca^{2+} . Pectin and sugar, and satisfactory gel strength with GS was obtained at a slightly higher pH. In pectin jelly with satisfactory gel strength, GS was stable; scarcely hydrolyzed by acid at a pH of 3.3 or higher when used in HMP jelly, and at 3.6 or higher in case of LMP jelly. AA

CEREALS

- 3470 KOCNA (P), HOLAKOVA-KOCOVA (M) and SASEK (A). Simple starch-gel electrophoresis of gliadin proteins using the LKB-multiphor system. *Z. Lebensmittel Unters. Forsch.* 177(6); 1983; 454-6

A simple modification of the horizontal starch-gel electrophoresis of gliadin proteins with the use of LKB Multiphor System has been developed. The thin-layer starch gel is prepared by using the original gel-moulding cassette and the procedure on the whole is easier. The sensitivity is comparable with that of the original method. Our modification moreover widens the field of application of the LKB Multiphor System. AA

- 3471 SEDLET (K), MATHIAS (M) and LORENZ (K). Growth-depressing effects of 5-n-pentadecylresorcinol: A model for cereal alkylresorcinols. *Cereal Chem.* 61(3); 1984; 239-41

RICE

- 3472 SIEBERT (G), WIEDE (H) and BRUNKE (H). New standards for rice, instant soups, coffee surrogates and spices. *Lebensmittelindustrie.* 30(9); 1983; 401-2 (German)
- 3473 BHASHYAM (MK) and SRINIVAS (T). Varietal difference in the topography of rice grain and its influence on milling quality. *J. Food Sci.* 49(2); 1984; 393-5, 401

In the transverse sections of rice grain in 21 varieties studied, the depth of the ventrilateral, centrilateral and dorsilateral grooves varied between 1-18, 2-28 and 6-88 μm , respectively. In the grains of any one variety the depth of the centrilateral grooves was equal or larger than the depth of the ventrilateral grooves and always smaller than the depth of the dorsilateral grooves. The photovolt reflectance values as a measure of whiteness indicated that the deeper the grooves the greater the requirement for bran removal during milling to attain a required whiteness. It was shown that milling breakage could be substantially reduced if shallow grooved varieties are used. AA

- 3474 GOODMAN (DE) and RAO (RM). A new, rapid, interactive image analysis method for determining physical dimensions of milled rice kernels. *J. Food Sci.* 49(2); 1984; 648-9

A method was developed using Image Analysis technology whereby rice kernels may be classified in less than a third of the time required by

conventional methods. Image Analysis permits the use of much greater number of kernels, providing a more representative measure of dimension while giving a better estimation of the actual sample variation among kernels. The Image Analysis method was found to compare very favourably with the conventional method using A Gaertner microscope and found to be superior to that using a projecting microscope. The reproducibility of the Image Analysis method was found to be better than $\pm 10\%$. AA

- 3475 KIM (I H) and KIM (S-K). Effects of phosphates on firming rate of cooked rice. *J. Food Sci.* 49(2); 1984; 660-61

The effects of phosphates having different contents of P_2O_5 on the rate of firming of cooked rice during storage at room temperature were investigated. Phosphates showed a definite effect in retarding the rate of firming of cooked rice. The cooked rice containing phosphates having 60 and 67% P_2O_5 contents were firmed slower by 1.4 and 1.6 times, respectively, than control. Phosphates having more than 68% P_2O_5 content showed similar results to that of 67% P_2O_5 phosphate, implying that P_2O_5 content may be an important effective factor in retarding the firming of cooked rice. AA

- 3476 PILLAIYAR (P). Applicability of the rapid gel test for indicating the texture of commercial parboiled rice. *Cereal Chem.* 61(3); 1984; 255-6

The commercial samples of parboiled rice were examined for their texture by employing a rapid (8 minute) test which enabled measurement of mean gel length of rice flours while reacting with 1.25% KOH without the grains being subjected to cooking. Based on these studies the samples examined may be classified into several groups; fresh, raw or parboiled at 80 C; old, raw, fresh, home parboiled; parboiled at or below 100 C; parboiled at 108 C; parboiled at 115.2 C; and pressure parboiled (PP). Texturally these may be grouped as: tender (parboiled at 80 C for 5 minutes); moderately tender to slightly tough (parboiled at 90 and 100 C for 5 to 10 minutes); and very tough (parboiled at 110 and 120 C for 5 or 10 minutes) and very tough (PP). BSN

- 3477 RUSSELL (PL) and JULIANO (BO). Differential scanning calorimetry of rice starches. *Starch.* 35(11); 1983; 382-6

DSC thermograms from 5-135 C of eight rice starches, pretreated with sodium dodecyl benzenesulphonate (DoBS) to remove milled rice proteins, gave gelatinization endotherms with characteristic temperature ranges. Good positive correlations were found between gelatinization temperatures measured by DSC and photometry, and between gelatinization enthalpies and gelatinization temperatures. The enthalpy of the amylose-lipid endotherm at 90-97 C was less for two DoBS-prepared rice starches than for the same pronase-treated starches. The endotherm was absent in waxy starch, and its enthalpy followed the level of lipids extracted by cold water-saturated butanol (WSB). It was concluded that DoBS treatment removed and replaced some of the starch lipid. Although this DoBS did not form a complex with amylose that was observable by DSC, the adsorbed DoBS was extracted by hot WSB. AA

RICE BRAN

- 3478 AZEEMODDIN (G) and THIRUMALA RAO (SD). Development of indigenous rice bran stabilizers. *Chem. Age India.* 35(2); 1984; 101-5

Cryogenic, thermal and chemical methods developed for stabilizing rice bran in India are discussed. KAR

- 3479 LAKSHMINARAYANA (T), AZEEMODDIN (G) and THIRUMALA RAO (SD). Edible grade rice bran oil. *Chem. Age India*. 35(2); 1984; 107-8

Rice bran oil extracted from rice bran within 24 hours of the production of bran has been refined by the standard AOCS Cup method (laboratory) and by centrifugal method (pilot plant). The refining losses are: 42% for un-dewaxed oil, 36% for un-dewaxed oil using molasses as co-additive with alkali, 31% for dewaxed oil in all laboratory scale experiments and 31% in the centrifugal method. The characteristics of refined and bleached rice bran oil correspond to Indian Standard Specifications for refined rice bran oil (edible grade). AA

WHEAT

- 3480 ZWINGELBERG (H), SEIBEL (W) and STEPHAN (H). Different grinding techniques and baking behaviour of wheat and rye whole meal. *Getreide Mehl Brot*. 38(3); 1984; 69-76 (German)

Rye and wheat grains of different qualities were milled in hammer mills, stone mills, and roller mills, to fine meals of comparable particle size distributions. Considerable differences in the wooliness of the meals were observed. Baking tests showed the best results - in terms of dough yield, volume, and crumb quality - when fine meals from roller mills were used for bread making. When particle size distributions of the samples are comparable, a close correlation exists between the wooliness of the meal and the volume of the loaf. Wheats with a softer grain structure and moderate protein content are preferable to hard, protein-rich wheats, for the production of meal and whole-meal bread. KMD

- 3481 HORVATIC (M), GRUNER (M) and FILAJDIC (M). Changes in the contents of certain minerals during the ripening of the wheat grain. *Nahrung*. 27(10); 1983; 975-82 (German)

- 3482 DAVIDSON (VJ), PATON (D), DIOSADY (LL) and LAROCQUE (G). Degradation of wheat starch in a single screw extruder: characteristics of extruded starch polymers. *J. Food Sci.* 49(2); 1984; 453-8

Wheat starch was processed in a 19 mm diameter, single screw extruder to study the physical and structural modifications that occur during extrusion cooking. Structural modification of the starch polymers was investigated using gel permeation chromatography (GPC), enzymatic digestions and dilute solution viscometry. Both the GPC and intrinsic viscosity results showed that the average molecular size significantly decreased as a result of extrusion processing. The relative amount of material excluded by Bio-Gel A 150 mm was considerably lower for extruded samples than for unprocessed wheat starch and this size reduction of the amylopectin fraction was attributed to mechanical rupture of covalent bonds. The characterization of the structural modifications of the starch polymers is reported. AA

- 3483 REDDY (LV), CHING (TM) and METZGER (RJ). Alpha-amylase activity in wheat kernels matured and germinated under different temperature conditions. *Cereal Chem.* 61(3); 1984; 228-31

- 3484 SEGUCHI (M). Oil-binding ability of heat-treated wheat starch. *Cereal Chem.* 61(3); 1984; 248-50

Prime starch fractionated from heat-treated wheat flour was found to possess high oil-binding ability. Prime starch heat-treated at 100-160 C

for 1 hour also possessed this ability. Treatment of heat-treated prime starch with 1% sodium dodecyl sulphate, water-saturated 1-butanol, or a mixture of chloroform-methanol (2:1) had no effect on this ability. Treatment with 7% HCl, 0.2% NaOH, α -amylase, or pepsin effectively caused oil-binding ability to be lost. AA

- 3485 KRUGER (JE). Rapid analysis of changes in the molecular weight distribution of buffer-soluble proteins during germination of wheat. *Cereal Chem.* 61(3); 1984; 205-8
- 3486 OMAYE (ST) and CHOW (FI). Effect of hard red spring wheat bran on the bio-availability of lipid-soluble vitamins and growth of rats fed for 56 days. *J. Food Sci.* 49(2); 1984; 504-6
- Semipurified diets containing either 0, 5 or 20% wheat bran were fed *ad libitum* to male Sprague-Dawley rats. Significant increases in weights ($P < 0.05$) were found for the stomach, $32.6 \pm 8.7\%$, and for the large intestine, $14.5 \pm 4.8\%$ in rats fed 20% wheat bran compared to the control rats fed 0% wheat bran. Wheat bran consumption had no effect on plasma vitamin E or plasma vitamin A levels after 56 days of feeding; however, plasma vitamin A and vitamin E levels were shown to decline after 6 weeks and 5 weeks respectively, on the wheat bran diets. These studies suggest that some metabolic modifications induced by dietary wheat bran undergo reversible adaptations that are time dependent. AA
- 3487 MONGEAU (R) and BRASSARD (R). Effects of dietary fibre from shredded and puffed wheat breakfast cereals on intestinal function in rats. *J. Food Sci.* 49(2); 1984; 507-9
- Rats were fed a semi-purified diet containing 63% puffed wheat (PW) or 63% shredded wheat (SW) breakfast cereals for 6 weeks. A 16% unprocessed wheat bran (WB) diet was used as control. The neutral detergent fiber (NDF) content was 3.2%, 7.9%, and 7.9% in diets PW, SW, and WB, respectively. Feces were collected during three 96-hour periods; fecal weight and volume were lower ($P < 0.001$), fecal density was higher ($P < 0.001$), and intestinal transit time was longer ($P < 0.01$) in group PW than in groups SW and WB. Results indicate that the dietary fiber content of puffed wheat breakfast cereals is lower than that of shredded wheat breakfast cereals. AA
- 3488 MITA (T) and MATSUMOTO (H). Dynamic viscoelastic properties of concentrated dispersions of gluten and gluten methyl ester: Contributions of glutamine side chain. *Cereal Chem.* 61(2); 1984; 169-73
- 3489 SEGUCHI (M). Oil-binding capacity of prime starch from chlorinated wheat flour. *Cereal Chem.* 61(3); 1984; 241-4
- Oil binding capacity of prime starch recovered by wet fractionating serially chlorinated flour progressed with rate of chlorination. When treated with proteolytic or amylolytic enzymes or with a solution of dilute acid, this capacity decreased. Chlorinated starch responded to iodine test when only treated with a proteolytic enzyme; the oil binding capacity of which was attributed to the surface coating of proteins on the starch. BSN
- 3490 SEGUCHI (M). Comparison of oil-binding ability of different chlorinated starches. *Cereal Chem.* 61(3); 1984; 244-7
- Lipophilic properties of starch developed on direct chlorination of wheat prime starch disappeared when treated with 7% HCl, α -amylase, or

pepsin, but were little affected by water saturated 1-butanol, chloroform-methanol (2:1) or sodium dodecyl sulphate solutions. Liphophilic properties were also observed in rice, potato and corn starches subjected to chlorination. Highest oil binding capacity was shown by chlorinated corn starch. Except for pepsin treatment response of other starches to treatments studied differed slightly from that of wheat prime starch. BSN

BUCKWHEAT

- 3491 IKEDA (K), ARIOKA (K), FUJII (S), KUSANO (T) and OKU (M). Effect of buckwheat protein quality of seed germination and changes in trypsin inhibitor content. *Cereal Chem.* 61(3); 1984; 236-8

MILLETS

BARLEY

- 3492 FREEMAN (PL) and PALMER (GH). The structure of the pericarp and testa of barley. *J. Inst. Brew.* 90(2); 1984; 88-94

Detailed microscopic study of the covering layers of the mature barley grain shows that beneath the husk the pericarp consists of highly compressed cell material bound by a thin outer cuticle. The testa is a double cell layer, also bound by an outer cuticle. An innermost cuticular membrane separates the testa from the remains of the nucellus. This membrane is of nucellar origin and not part of the testa. The outer cuticle of the testa is incomplete in the ventral furrow and in the micropylar area of the grain. The absence of the testa cuticle and the relatively uncompressed nature of the pericarp at the micropyle may facilitate uptake of solutes by the embryo. AA

- 3493 FREEMAN (PL) and PALMER (GH). The influence of the pericarp and testa on the direct passage of gibberellic acid into the aleurone of normal and abraded barleys. *J. Inst. Brew.* 90(2); 1984; 95-104

The influence of the pericarp and testa of barley on the uptake of exogeneously applied gibberellic acid (GA_3) was investigated using a method of 'distal' soaking which allowed the grain to be soaked in test solutions without the interference of embryo growth. Using autoradiographic and enzymic studies, it was observed that whilst the testa of mature or immature barley was previous to gibberellic acid, the pericarp was not. Pericarp abrasion allowed the hormone to enter the distal areas of abraded grains, causing improved distribution of endosperm-degrading enzymes. Microscopic studies confirmed that endosperm breakdown progressed from both ends of abraded grains, while in control grains modification proceeded distally and asymmetrically from the embryo. AA

- 3494 MacGREGOR (AW) and MORGAN (JE). Structure of amylopectins isolated from large and small starch granules of normal and waxy barley. *Cereal Chem.* 61(3); 1984; 222-8

PEARL MILLET

- 3495 ABDELRAHMAN (AA) and HOSENEY (RC). Basis for hardness in pearl millet, grain sorghum, and corn. *Cereal Chem.* 61(3); 1984; 232-5

Particle size index studies indicated that 60% tertiary butanol was more effective than other solvents in softening millet and corn so as to make their grinding easier. For softening sorghum grits, a combination of t-butanol and sodium bisulphite or mercaptoethanol was required. The same combination made corn grits softer, enabling 78% of the material to pass through a 100 mesh (150 μ m) sieve. The solubles removed from the grains on admixture with starch were made into pellets. The force required to break a pellet as measured with an Instron machine was directly related to the amount of solubles added to starch. BSN

MAIZE

- 3496 KRISHNAVENI (S). Biochemical constituents of certain promising maize cultures. *Madras Agric. J.* 70(2); 1983; 139-40

Several maize cultures were screened for their limited amino acids, viz. lysine and tryptophan in addition to starch and oil contents. The cultures rich in protein, amino acids, starch and oil were identified to obtain variety of better quality. Tryptophan content was 0.4-1.0% (% of crude protein) and it decreased with increase in protein content. The cultures UMI 25 x UMI 51 and 25 x 105 contained 4.34-4.45% of protein. MVG

- 3497 INOUCHI (N), GLOVER (DV), TAKAYA (T) and FUWA (H). Development changes in fine structure of starches of several endosperm mutants of maize. *Starch.* 35(11); 1983; 371-6

Distribution of components of maize starches from several endosperm mutants sampled at three stages of development were investigated by gel filtration after debranching by isoamylase. The waxy (wx) starches consisted of only amylopectin, and the distribution of components did not change during development. In other starches: normal, amylose-extender (ae), dull (du), sugary-1 (su-1) and sugary-2 (su-2) starches, amylose contents increased during the 20-35 days after pollination (DAP) period of development. The ae, du, su-1 and su-2 mutants produced high-amylose starches, while amylopectin of su-2 was normal type and those of ae, du and su-1 were novel type, and ae starches possessed longer average chain-lengths of amylopectin. Phytoglycogens were prepared from su-1 kernels during development and their characteristics were compared with those of su-1 starches. The characteristics of phytoglycogens did not change during the developmental phase studied and the average chain lengths of phytoglycogens were shorter than those of amylopectin of su-1 starches at each state of development. AA

- 3498 GERMANI (R), CIACCO (CF) and RODRIGUEZ-AMAYA (DB). Effect of sugars, lipids and type of starch on the mode and kinetics of retrogradation of concentrated corn starch gels. *Starch.* 35(11); 1983; 377-81

The retrogradation of concentrated gels of three types of corn starch (Normal, Amylose Extender and Waxy) and the influence of certain sugars and lipids on the mode and kinetics of retrogradation were investigated. The lipids tested were triglycerides, hydrogenated babassu oil and hydrogenated vegetable oil. The results based on the AVRAMI theory indicated that the mechanism of crystallization is instantaneous nucleation followed by a rod-like growth of crystals, regardless of the type of starch, sugar

or lipid used. In general, sugars increased the retrogradation rate while lipids retarded it. The disaccharides were more effective in increasing the velocity of retrogradation than glucose. The results suggested that a relationship exists between the velocity of retrogradation and the number of hydroxyl groups and/or size of the molecule. Among the lipids, the most effective in retarding retrogradation was that with the shortest fatty acid chain. AA

- 3499 GAUR (VK) and SIRADHANA (BS). Effect of age of maize grains on aflatoxin B₁ formation by *Aspergillus flavus* Link ex Fries. *Madras Agric. J.* 70(4); 1983; 277-9

Grains of a maize hybrid of different ages were studied. 50 g of hybrid maize grain of different ages were sterilized and inoculated with 1.5 ml of spore suspension (4×10^4 spores/ml) of *Aspergillus flavus* and incubated at 26 ± 1 °C for 6 days. The inoculated grains were then screened for aflatoxin formation. Aflatoxin B₁ was maximum on 3 year old grains followed by 2 and one year old grains. The difference in aflatoxin content between 3 and 2 year grains was not very significant and 1 year old was highly significant. MVG

- 3500 SHOTWELL (OL), BENNETT (GA), KWOLEK (WF) and HESSELTINE (CW). Effect of propionic acid on aflatoxin levels of stored Georgia 1981 dent corn samples. *J. Am. Oil Chem. Soc.* 61(3); 1984; 526-8

Corn samples shelled and dried after 6 weeks of storage showed aflatoxin level of 601 ng/g. Samples stored with formulation containing 2.5%, 1% and 0.5% propionic acid low average aflatoxin levels of 340 ng/g; 351 ng/g, and 376 ng/g respectively. JVS

- 3501 MURDOCK (FA) and FIELDS (ML). B-vitamin content of natural lactic acid fermented corn meal. *J. Food Sci.* 49(2); 1984; 373-5

- 3502 NOUT (MJR) and SAINT-HILAIRE (P). Influence of storage conditions and packaging material on the multiplication of *Aspergillus flavus* and its production of aflatoxin B₁ in sifted maize meal. *Chem. Mikrobiol. Technol. Lebensm.* 8(3); 1983; 83-6

Sifted maize meal was inoculated with three concentrations of aflatoxin producing *Aspergillus flavus*, packaged in either commercial kraft paper or porous nylon cloth, and stored for six months under conditions representative of the Kenyan climate. Results obtained show that, (a) kraft paper was not an effective barrier against moisture migration, but served to protect against insect infestation; (b) packaging in porous nylon cloth resulted in considerable insect infestation within two months of storage; (c) the growth of *A. flavus* was not supported by the packaged product and (d) during the storage period only trace amounts of aflatoxin B₁ were produced. It appears that commercial sifted maize meal is not a product at risk of being contaminated with aflatoxins during storage, and that high levels in this product would originate from maize containing aflatoxin prior to milling. AA

PULSES

- 3503 SUDHAKAR PRABHU (K), SALDANHA (K) and PATTABIRAMAN (TN). Natural plant enzyme inhibitors: A comparative study of the action of legume inhibitors on human and bovine pancreatic proteinases. *J. Sci. Food Agric.* 35(3); 1984; 314-321

Inhibition of total proteolytic (caseinolytic), tryptic (by hydrolysis of benzoyl arginine *P*-nitroanilide) and chymotrypic (by hydrolysis of acetyl tryosine ethyl ester) activities by ten species of legume seeds on human and bovine pancreatic proteases were compared. Sword bean extract had a negligible action on human enzymes, but could completely inhibit bovine trypsin and chymotrypsin. Indian red wood seed extract was more active on human than on bovine enzymes, where as soya bean, field bean, kidney bean and Bengal gram were more active on the bovine counterparts. While acacia seed extracts displayed more pronounced action on human trypsin and chymotrypsins, it was more effective in inhibiting the total proteolytic activity of the bovine system. Cowpea and red gram were more effective in inhibiting the human chymotrypsins. The relative contributions of trypsin plus chymotrypsins, elastases and carboxypeptidases to the total proteolytic activity of human pancreatic preparation were found to be 50, 25 and 25% whereas in the bovine system the values were 75, 20 and 5%. AA

- 3504 TECKLENBURG (E), ZABIK (ME), UEBERSAX (MA), DIETZ (JC) and LUSAS (EW). Mineral and phytic acid partitioning among air-classified bean flour fractions. *J. Food Sci.* 49(2); 1984; 569-72, 584

Hull flours and air-classified intermediate starch, high starch, and high protein navy, pinto, and black bean flours were analyzed for mineral content and phytic acid. Phytic acid content ranged from 4.29-8.72 mg/g in the high starch flours to 23.74-30.22 mg/g in the protein flours. Total phosphorus content proved to be a good indicator of phytic acid content. Zinc, iron, potassium, and magnesium partitioned into the protein flours of each bean type. Strong and significant correlation coefficients obtained between phytic acid content and the content of these minerals, and between the content of these minerals and protein content suggest that metallic phytate complexes were present. AA

ADZUKI BEAN

- 3505 TIAHJADI (C) and BREENE (WM). Isolation and characterization of Adzuki bean (*Vigna angularis* cv. Takara) starch. *J. Food Sci.* 49(2); 1984; 558-62, 565

MUNG BEAN

- 3506 NARASIMHA RAO (Desirazu) and APPAJI RAO (N). Alterations in properties of mung bean (*Vigna radiata*) serine hydrotransferase consequent on conformational changes induced by folic acid and L-serine. *Indian J. Biochem. Biophys.* 20(6); 1983; 362-8

Addition of serine and folic acid induce different conformations in the mung bean hydroxymethyltransferase (HMT). They stabilised HMT to different extents against inactivation on storage at +4 C. The tetrahydrofolate interaction of the two enzyme forms (folate- and serine-) had the hill coefficient values (n_H) of 2.2 ± 0.1 and 1.4 ± 0.1 respectively. The two enzyme terms had different temperature-activity profiles particularly in the range of 50-70 C. Folate enzyme was slowly inactivated but the serine enzyme was not inactivated even after 30 min heating at 60 C. n_H value for the latter enzyme decreased to 1.1 ± 0.1 when heated at 65 C for 20 minutes but the value of 2.0 ± 0.1 was restored when serine was removed by dialysis. The n_H value was not affected by the temperature of assay.

Both enzymes were stable during storage. It was shown that catalytic activity of arginine residue was essential for chemical modification using phenyl glyoxal. Folate enzyme was rapidly inactivated by *n*-bromosuccinimide while the serine enzyme was resistant to this reagent. The former enzyme also lost activity gradually with 0.5M guanidinium chloride while the latter was rapidly inactivated. The folate enzyme was resistant to inactivation by chymotrypsin while the serine form inactivated rapidly. AA

KIDNEY BEAN

- 3507 AGUILERA (JM), CRISAFULLI (EB), LUSAS (EW), UEBERSAX (MA) and ZABIK (ME). Air classification and extrusion of navy bean fractions. *J. Food Sci.* 49(2); 1984; 543-6

Pilot plant air classification of raw beans (*Phaseolus vulgaris*) produced high-protein fractions (HPF) containing 51.4% protein and high-starch fractions (HSF) having about 50% starch. Particle size distribution analyses and scanning electron micrographs confirmed the fractionation of starchy and proteinaceous materials. Extruded corn/HSF blends had lower water absorption and water solubility indices, higher protein content, and a better balanced amino acid pattern than pure corn extrudates. Extrusion-texturized vegetable proteins obtained by substituting HPF for defatted soy flour at levels of 10, 20 and 30% had similar functional properties as the 100% texturized soy. Air classification followed by extrusion-cooking is a feasible alternative for dry-processing of beans into products for human consumption. AA

PEA

- 3508 BEAL (L), FINNEY (PL) and MEHTA (T). Effects of germination and dietary calcium on zinc bioavailability from peas. *J. Food Sci.* 49(2); 1984; 637-641

Bioavailability of zinc was determined by rat weight gain and tibia Zn response from whole pea sprouts (WPS), heat treated peas (HTP) and purified diets (PD 1 and 2) supplemented with Zn and phytate for similar phytate/Zn molar ratios (phy/Zn). With diets adequate in Ca (0.75%), weight gains from WPS (phy/Zn = 24) and HTP (phy/Zn = 39) were equivalent or better to a nonphytate control (NPC). Tibia Zn decreased in order from: NPC, WPS, PD1, HTP and PD2. At the 1.5% Ca level reduced growth responses from WPS and HTP indicated interaction between Ca and phytate. Zn availability from peas may be superior to that from grains and other legumes previously reported. The decreased phytate and increased phytase resulting from germination may explain the enhanced responses from pea sprouts. AA

COWPEA

- 3509 GIGA (DP) and SMITH (RH). Comparative life history studies of four *Callosobruchus* species infesting cowpeas with special reference to *Callosobruchus rhodesianus* (PIC) (Coleoptera: Bruchidae). *J. Stored Prod. Res.* 19(4); 1983; 189-98

A comparative study of the ecology of *Callosobruchus analis* (F.), *C. chinensis* (L.), *C. rhodesianus* (Pic) and two strains of *C. maculatus* (F.) was made at three temperatures (25, 30 and 35 C) and three relative humidities (60, 70 and 80% r.h.). The performances of *C. rhodesianus* and the

strain of *C. maculatus* from Brazil were also compared at 20 C. The intrinsic rates of increase of each species at each temperature were estimated. The optimum temperature for multiplication of all species was around 30 C. Total oviposition was highest at 30 C for all species, but survival from egg to adult was highest at 25 C for *C. rhodesianus* and the Malawi strain of *C. maculatus* compared with 30 C for the others. Development of both strains of *C. maculatus* was fastest at 35 C, but all other species developed most rapidly at 30 C. Relative humidity in the range 60-80% had no appreciable effect on any of the biological characteristics studied. The performance of *C. rhodesianus* was better at 20 C than that of the Brazilian strain of *C. maculatus*, and the results are discussed in relation to the distribution of the two species in Africa. AA

PIGEON PEA

- 3510 DEV (DK) and JADHAV (SJ). Influence of certain physico-chemical treatments on the cookability of pigeon pea (*Cajanus cajan*). *Nahrung*. 27(10); 1983; 995-1002

- 3511 SINGH (U), JAIN (KC), JAMBUNATHAN (R) and FARIS (DG). Nutritional quality of vegetable pigeonpeas (*Cajanus cajan* (L.) Mill sp.): Mineral and trace elements. *J. Food Sci.* 49(2); 1984; 645-6

Among the genotypes tested a considerable variation was observed in phosphorus, potassium and calcium of both green and mature seeds whereas the variation was small for magnesium. When consumed, green seeds are a richer source of iron, copper and zinc on a dry matter basis than the mature seed whereas there was a reverse trend for manganese. The calcium content of mature seed was significantly higher than green seed and this was attributed to the seed coat content of the mature seed. AA

SOUTHERN PEA

- 3512 SHEWFELT (RL). Quality and maturity indices for postharvest handling of southern peas. *J. Food Sci.* 49(2); 1984; 389-92

Purple hull pinkeye southern peas were harvested at three levels of maturity, shelled and stored at three temperatures (1, 5, and 20 C). Samples were evaluated at three storage intervals (1, 4 and 7 days) using 11 different indicators of quality. Alcohol insoluble solids and total solids measurements were most closely related to maturity differences. Derived instrumental colour functions (ΔH and ΔE), pH, total acidity, and % green peas were the quality indices providing the best separation of the effects of maturity and storage. Instrumental colour values were more closely correlated to changes in % green peas than total chlorophyll concentration. The proposed indices provide the means for a unified study of quality changes in southern peas during all stages of postharvest handling. AA

WINGED BEAN

- 3513 KORTT (AA) and CALDWELL (JB). Characteristics of the proteins of the tubers of winged bean (*Psophocarpus tetragonolobus* (L) DC). *J. Sci. Food Agric.* 35(3); 1984; 304-313

The crude protein content of 6 varieties of *Psophocarpus tetragonolobus* varied from 12.7 to 16.9%. The amino acid make up was nutritionally accept-

able except for S-amino acids. The tuber protein showed two polypeptides of M_r 30,000 and 20,000. Fractionation revealed that 35% of tuber proteins was composed of trypsin inhibitors and haemagglutinins. In addition, 3 basic proteins, 3 acidic proteins and a minor component with high cystine level were identified. JVS

- 3514 YANAGI (SO). Winged bean protein in comparison with other legume protein. *JARQ*. 18(1); 1984; 53-9

Amino acid composition in winged bean seeds are almost similar to those of soybean. Content of lysine is higher than other main legume seeds and percentages of glutamine and asparagine are high. The article further reviews the extraction characteristics and protein pattern of winged bean seed. KAR

- 3515 NARAYANA (K) and NARASINGA RAO (MS). Effect of acetylation and succinylation on the functional properties of winged bean (*Psophocarpus tetragonolobus*) flour. *J. Food Sci.* 49(2); 1984; 547-50

Winged bean flour was acylated to various degrees and changes in functional properties were monitored. Nitrogen solubility in water increased upto ~80% acylation and then decreased. Water absorption capacity increased continuously with the extent of acylation. The fat absorption capacity of the acetylated flour increased up to ~30% acetylation and then decreased while that of the succinylated flour remained unchanged. Emulsion capacity showed the same trend as nitrogen solubility in water. Foam capacity increased due to acylation, but foam stability decreased. Bulk density of the acetylated flour increased upto ~80% acetylation and then decreased. Succinylated flour had higher bulk density at all levels of succinylation. AA

- 3516 SRI KANTHA (S) and ERDMAN (JW) Jr. The winged bean as an oil and protein source: A review. *J. Am. Oil Chem. Soc.* 61(3); 1984; 515-25

Review of utilisation and nutritional features of winged bean during the last 10 years. It covers the classification of winged bean proteins; nutritional features and biologically active principles; quality of protein and its functional properties; and protein-based products. JVS

OILSEEDS AND NUTS

RAPSEED

- 3517 ROBBELEN (G). Progress in the world production of rapeseed. *Fette Seifen Anstrichm.* 85(10); 1983; 395-398 (German)

In 1982, the area under rapeseed cultivation in the EEC countries exceeded 1,000,000 ha for the first time; a similar expansion was seen in other parts of the world also. Interest is being shown in cultivation of other Brassica species as well; namely, *B. napus*, *B. campestris*, and *B. juncea*. The so-called 0-0 (zero-zero) forms - low in erucic acid, low in glucosinolates - are becoming popular. Progress may be noted also in the increase of polyenoic fatty acid content in rapeseed oil. Selective breeding of the new varieties has - hitherto - always improved their yield per hectare. Varieties resistant to diseases caused by *Phoma lingam* and *Sclerotinia sclerotiorum* are under development. KMD

SOYABEAN

- 3518 KATSUTA (K) and HAYAKAWA (I). Studies on the spun-fiber strength of soy protein. *J. Jpn. Soc. Food Sci. Technol.* 30(5); 1983; 264-9 (Japanese)
- A convenient and reliable method for evaluating fiber strength of soy protein dope during spinning was studied. The method applied to calculate the drags received by cylindrical body moving in the stationary fluid could be conveniently used to calculate the fiber strength during spinning. The spun-fiber strength was proportional to the protein concentration in dope. Finally, fibers could not be spun when dope was prepared with less than 1.0% NaOH (pH 12.20), and viscoelasticity of dope slightly increased with the lapse of time and gel formation also increased. But, on the contrary, when dope was prepared with more than 1.1% of NaOH concentration (pH 12.45), the viscoelastic value of dope decreased with the lapse of time and showed the fluidity. By incubating dope with more NaOH, than 1.1% maturation effects could be obtained; when the dope was prepared with 1.5% NaOH (pH 13.1) and incubated at 50 C for 30 minutes, the spun-fiber strength was the highest on adjusting the NaOH concentration to over 1.6%, no maturation effects could be observed, and the viscoelastic value and strength of the fiber also decreased, since dope changed to sol state and the molecular weight of the protein decreased. AA
- 3519 TAKAHASHI (S), KOBAYASHI (R), WATANABE (T) and KAINUMA (K). Effects of addition of soyabeanprotein on gelatinization and retrogradation of starch. *J. Jpn. Soc. Food Sci. Technol.* 30(5); 1983; 276-82
- The effect of the addition of isolated soyabeanprotein on gelatinization and retrogradation properties of starch during heating and storage was studied by measuring the enzymic susceptibility, swelling power, solubility and X-ray diffraction. Swelling power and solubility of potato and sago starch decreased remarkably by adding isolated soyabeanprotein. During heat gelatinization of starch, the addition of isolated soyabean protein caused a delay of gelatinization of all the starches examined. By the prolonged heating at 92.5 C, the degree of gelatinization reached the same level as the starch paste without isolated soyabeanprotein. During the cold storage of starch paste, the retrogradation of potato starch was remarkably accelerated by the addition of isolated soyabean protein. Potato starch retrograded at the highest rate by the existence of isolated soyabean protein among the examined starches. The rest of the starches were not affected much by the addition of isolated soyabean protein. X-ray diffractogram obtained by the cold-stored starch paste with isolated soyabeanprotein showed a much sharper pattern than the normal retrograded starch paste. AA
- 3520 RANGER (CR) and NEALE (RJ). Iron availability from soy, meat and soy/meat samples in anemic rats with and without prevention of coprophagy. *J. Food Sci.* 49(2); 1984; 585-9
- The biological availability of iron from samples of soy proteins (nontextured, extruded and spun), meat (chicken and beef) and spun soy/meat combination products was compared to ferrous sulphate using a hemoglobin regeneration bioassay. Compared to ferrous sulphate (55%) iron availability from the various soy proteins ranged from 29-57%, for the meat samples 32-39% and for soy/meat combination products 61-92%. There was no significant improvement in iron availability by fortification with ferrous sulphate or ascorbic acid. Prevention of coprophagy in the anemic rats during the bioassay using aluminium anal cups produced varying degrees of reduction in iron availability for various samples and this effect clearly needs further investigation. AA

- 3521 ABDULLAH (A) and BALDWIN (RE). Mineral and vitamin contents of seeds and sprouts of newly available small-seeded soyabeans and market samples of mungbeans. *J. Food Sci.* 49(2); 1984; 656-7

Seeds and sprouts of two strains of small-seeded soyabeans (Jaerae-jong 320-7 and SP 75051) were either comparable, or higher, in contents of several minerals and thiamin than locally available mungbeans. Germination reduced iron and increased phosphorus and sodium contents in both soyabeans and mungbeans, but potassium content was not changed significantly. Germination increased amounts of thiamin, riboflavin, niacin and ascorbic acid in both soyabeans and mungbeans. AA

- 3522 CHOMPREEEDA (PT) and FIELDS (ML). Effects of heat and natural fermentation on amino acids, flatus producing compounds, lipid oxidation and trypsin inhibitor in blends of soyabean and cornmeal. *J. Food Sci.* 49(2); 1984; 563-5

The soyabean meal made from autoclaved soyabeans was blended to improve nutritive value of cornmeal at 10, 15 and 20% levels of soyabean meal. Both raffinose and stachyose were reduced due to autoclaving of soyabean meal and to fermentation of the blends of corn and soyabean meals. Fermentation increased lysine, methionine, and tryptophan in the blends. These increases in the limiting amino acids resulted in increase in % RNV. AA

- 3523 CHOMPREEEDA (PT) and FIELDS (ML). Effects of heat and fermentation on the extractability of minerals from soyabean meal and cornmeal blends. *J. Food Sci.* 49(2); 1984; 566-8

Autoclaving (121 C for 30 minutes) soyabean meal reduced phytate phosphorus by 17.5% phosphorus soluble in 0.03N HCl decreased 27.1% and iron decreased 17.2%. Heat treatment increased ($P < 0.05$) extractability of zinc and potassium (soluble in 0.03N HCl) in soyabean meal. A natural lactic acid fermentation of corn meal decreased phytate phosphorus by 77.8% and increased phosphorus soluble in 0.03N HCl by 37.9%. Phosphorus and iron from corn meal soluble in 0.03N HCl decreased in quantity when soyabean meal was added. There was little difference in the % magnesium, zinc and potassium soluble in 0.03N HCl whether in corn meal or corn meal-soyabean meal blends. AA

- 3524 WANG (LC). Ultrasonic extraction of a heat-labile 7S protein fraction from autoclaved, defatted soyabean flakes. *J. Food Sci.* 49(2); 1984; 551-4

Conventional stirring extraction of soyabean proteins from autoclaved or heat-treated defatted flakes seldom reaches 30% of the total proteins. Using ultrasonic energy to disperse proteins in water from such treated flakes, one extraction can solubilize 80%. Gel electrophoresis of water extractable proteins in extracts prepared by the two methods of extraction reveals that extraction by stirring failed to extract a specific heat-labile protein fraction in 7S proteins that is extractable by sonication. Ultracentrifugation and gel filtration analyses show that sonication induced formation of aggregates, and the size of aggregates, rate of formation, and water solubility are different than those formed by heat treatment. The effects of heat and sonication treatments on isolated 7S proteins were also investigated. AA

SUNFLOWER SEED

- 3525 SCHWENKE (KD) and RAUSCHAL (EJ). Functional properties of plant proteins. Part 6. Some functional properties of succinylated protein isolates from sunflower seed. (*Helianthus annuus* L.). *Nahrung*. 27(10); 1983; 1015-24

ALMOND

- 3526 SCHADE (JE) and KING (AD) Jr. Fluorescence and aflatoxin content of individual almond kernels naturally contaminated with aflatoxin. *J. Food Sci.* 49(2); 1984; 493-7

An effort was made to relate the aflatoxin content of individual almond kernels to their fluorescent colour. The fluorescence of individual blanched almonds and defective almonds, most of which lack an intact pellicle, was described by means of Methuen colour charts before each kernel was analyzed for aflatoxin. Almonds that fluoresced violet-purple under long-wave UV light were found to contain high levels of aflatoxins B₁ and B₂ but, with perhaps one exception, no measurable amounts of aflatoxins G₁ and G₂. Some diced almonds with blue fluorescence had all four aflatoxins present, but at much lower levels than in the violet-purple kernels. Aflatoxin ranged from 1.0×10^5 to 2.5×10^6 ppb in the violet-purple kernels. These values agree with previous estimates of aflatoxin concentration per contaminated nut. Almond kernels with violet-purple fluorescence should be culled. AA

COLA

- 3527 WILEY (RC), LOUIE (MK) and SHEU (M-J). Studies on turpentine-like off-odour in cola. *J. Food Sci.* 49(2); 1984; 485-8, 497

A turpentine-like off-odour and unusual taste development can occur in some colas held to the end of their normal shelf-life and stored at temperatures of 20 C and warmer. Extended storages (up to 8 weeks) at 20 or 40 C under fluorescent or ultraviolet light have been conducted on colas bottled with closures containing different liner materials. Results suggest that off-odour development is due to excess p-cymene in the cola. The p-cymene appeared to be a product of the dehydrogenation of γ -terpinene and limonene with titanium dioxide (TiO₂) in the ethylene vinyl acetate (EVA) white liner acting as a catalyst. Butylated hydroxytoluene (BHT) at levels of about 750 ppm greatly reduced this reaction. AA

TUBERS AND VEGETABLES

- 3528 HARI SINGH and VERMA (SR). A simple mechanical device for extraction of vegetable seeds. *Invent. Intell.* 19(4); 1984; 181-5

Describes a simple and low cost mechanical device for extracting seeds from various vegetable fruits like, brinjal, tomato, cucumber, watermelon, tinda and ashgourd. AA

ALLIUM GRAYI

- 3529 HASHIMOTO (S), MIYAZAWA (M) and KARMEOKA (H). Volatile flavour components of *Allium grayi*, Regel. *J. Sci. Food Agric.* 35(3); 1984; 353-6
A. grayi is eaten as a vegetable called *Nobiru* in Japan. 47 compounds were positively identified by capillary GC of the oil obtained by ether extraction of steam distillate. They included 11 sulphur compounds, 5 alcohols, 7 aldehydes, 3 ketones, 2 furanones and 19 other compounds. JVS

RADISH

- 3530 KATO (S), KITAMURA (E) and OHSHIMA (S). Storage of salted radish in nitrogen gas packaging system. *J. Jpn. Soc. Food Sci. Technol.* 30(5); 1983; 300-302 (Japanese)

POTATO

- 3531 KEMPF (W). Processing of potatoes into source material for chemical-technical industries. *Starch.* 35(11); 1983; 386-93
 A discussion of potato processing and starch production in Germany and the EEC, over the period 1976-81, is followed by a comprehensive description of the industrial process of potato starch production. Possibilities of using potato starch as an additional source of starch polymerisates, starch modifications, and starch saccharification products have been discussed. Potato starch - a renewable resource - will never be able to solve the continuously increasing petroleum and natural gas problems, but it can make an important contribution to their solution. KMD
- 3532 BERGTHALER (W) and ZWINGELBERG (H). Problems in the comminution of dehydrated potatoes. *Gordian.* 83(11); 1983; 226-34 (German)
 Various industrial methods of comminution of dehydrated potatoes have been reviewed and compared. The product from roller mills has a normal (and more uniform) particle size distribution, while the product from centrifugal mills (e.g. hammer mills) has an approximately logarithmic (and less uniform) particle size distribution. The roller-mill products have a significantly greater water uptake capacity than the centrifugal mill products; the reason for this difference is not known at present. The texture, or cutting quality, of potato dumplings made from comminuted dehydrated potatoes depends mainly on the medium particle size. KMD
- 3533 MICA (B). Effect of fertilization on the viscosity of potato starch. *Starch.* 35(11); 1983; 394-6
 The starch content of potato cultivar, Radka, during particular phases of growth, was affected by the Ca and Mg content of the NPK fertilizer used. A treatment with NPK and Mg resulted in the highest starch content, while a treatment with NPK and Ca produced a starch having the highest viscosity. KMD
- 3534 NARA (S), and KOMIYA (T). Studies on the relationship between water-saturated state and crystallinity by the diffraction method for moistened potato starch. *Starch.* 35(12); 1983; 407-10

- 3535 PUTZ (Von B). Critical consideration of determination of dry matter and starch content of potatoes. *Starch*. 35(12); 1983; 415-9 (German)

TAPIOCA

- 3536 FLORES (DM), GARCIA (VV) and URITANI (I). The relationship between methods of making cassava flour and coumarin formation during drying. *J. Jpn. Soc. Food Sci. Technol.* 30(3); 1983; 175-7
- 3537 AHMED (SY), GHILDYAL (NP), KUNHI (AAM) and LONSANE (BK). Confectioner's syrup from tapioca processing waste. *Starch*. 35(12); 1983; 430-32
- The possibility to produce confectioner's syrup from tapioca processing waste by acid hydrolysis was explored at different substrate as well as acid concentrations, pressures and times. Syrup for confectionery use can be effectively produced at various combinations of the parameters though severe hydrolysis conditions have to be employed as compared to the commercial starch. Economic considerations demand the use of waste slurry of 20% concentration with 4% sulphuric acid and the hydrolysis at 15 Pa for 15 minutes. The problem of disposal of the waste could be solved by gainfully utilizing it for the production of syrup meeting required standards. AA

ARTICHOKES

- 3538 HORMAN (I), BADOUD (R) and AMMANN (W). Food related applications of one- and two- dimensional high-resolution proton nuclear magnetic resonance; Structure and conformation of cynarin. *J. Agric. Food Chem.* 32(3); 1984; 538-40
- Cynarin is a depside diester belonging to the chlorogenic acid family isolated from artichokes. The two caffeoyl residues were found to be axially disposed on the cyclohexane ring of quinic acid. This observation was made from only 90 microgram of cynarin dissolved in H₂O using the NMR technique. JVS

- 3539 MAZZA (G). Sorption isotherms and drying rates of Jerusalem artichoke (*Helianthus tuberosus* L.). *J. Food Sci.* 49(2); 1984; 384-8

LEAFY VEGETABLES

- 3540 MATTSSON (P), LARSSON (B), SLORACH (S), PETTERSON (A), BERGQUIST (N), HANSSON (H), ARNFLYKT (A) and HENRIKSSON (U). Elevated levels of lead and PAH in leafy vegetables grown in Landskrona, Sweden. *Var Foda*. 35(9); 1983; 374-94 (Swedish)

CELERY

- 3541 BRANDL (W), GALENSA (R) and HERRMANN (K). HPLC-analysis of celery components (Hydroxycinnamic acid esters, sugars, mannitol, phthalides). *Z. Lebensmittel Unters Forsch.* 177(5); 1983; 325-7 (German)
- 3542 BERGER (RG), KOGEL (F), DRAWERT (F) and RADOLA (B). Quantitative composition of natural and technologically changed aromas of plants. X. Changes of aroma substances during processing of dry products from celery tubers. *Z. Lebensmittel Unters Forsch.* 177(5); 1983; 328-32 (German)

TOMATO

- 3543 SHOMER (I), LINDNER (P) and VASILIVER (R). Mechanism which enables the cell wall to retain homogenous appearance of tomato juice. *J. Food Sci.* 49(2); 1984; 628-33

Intact or disrupted cell walls from tomato pericarp cannot be suspended in the juice, even at higher densities (up to 1.2 g/ml) or viscosities (up to 70 centistokes) than those of natural juice serum. Hence, the viewpoint of swelled precipitate rather than suspension has to be considered in tomato juice. Degradation of insoluble pectin by a relatively high concentration of exogenous pectinases led to swelling of the wall and ultrastructural studies revealed partial dispersion of the microfibrillar system in the wall. Cellulase activity led to partial or complete degradation of the microfibrillar system, with a resultant collapse of the precipitate. Expansion of the microfibrillar system and retention of its ability to withstand collapse under gravity stress, make possible the swelled precipitate and homogeneous appearance of insoluble particles along the juice column during shelf life. AA

- 3544 ANDERSON (RE). Growth and corresponding elevation of tomato juice pH by *Bacillus coagulans*. *J. Food Sci.* 49(2); 1984; 647-7

B. coagulans was inoculated into sterile, tubed tomato juice and growth and pH were observed for 21 days. Juice samples initially at pH 4.5 supported good growth; pH was elevated to 5.0 after 6 days incubation at 35 C. Other tomato juice samples (initial pH 5.0 or 5.5) also supported good growth of these flat-sour bacteria and with corresponding increases in pH. The results indicate that flat-sour spoilage of tomatoes and similar foods may cause decreased acidity, thus possibly allowing outgrowth of *Clostridium* spores in these water bath-processed foods. AA

- 3545 SIDHU (JS), BHUMBLA (VK) and JOSHI (BC). Preservation of tomato juice under acid conditions. *J. Sci. Food Agric.* 35(3); 1984; 345-52

A technique for preserving tomato juice and crushed tomatoes under acid conditions has been developed. This eliminates the need for the usual processing time of 55 minutes in boiling water for 650 ml glass bottles which would result in considerable savings in energy requirements by the tomato processing industry. The ketchup prepared from the acidified tomato juice and crushed tomatoes (after neutralisation) was rated by the panelists to be as good as a commercial tomato ketchup sample. AA

CUCUMBER

- 3546 COSTILOW (RN), UEBERSAX (MA) and WARD (PJ). Use of chlorine dioxide for controlling microorganisms during the handling and storage of fresh cucumbers. *J. Food Sci.* 49(2); 1984; 396-401

Chlorine dioxide (ClO_2) was very effective in killing microorganisms in water used for handling cucumbers. It was at least 10 times more effective than chlorine or acidified solutions of stabilized chlorine dioxide (Anthum Dioxide, International Chemicals, Clark, NJ). Model systems indicated that feeding rates of 20-35 ppm/hour were adequate to maintain effective and detectable residues of ClO_2 in both washing and hydrocooler waters. However, holding cucumbers in water with even high concentrations (100 ppm) of ClO_2 failed to (a) significantly reduce populations of microbes found in blended samples, (b) influence the initiation of a natural lactic acid fermentation after brining the cucumbers, or (c) delay the development of visible microbial growth during storage of cucumbers. AA

FRUITS

DATE

- 3547 SAWAYA (WN), KHALIL (JK) and SAFI (WJ). Chemical composition and nutritional quality of date seeds. *J. Food Sci.* 49(2); 1984; 617-619

The seeds of Ruzeiz and Sifri date cultivars, on the average, contained 6.5% protein, 10.4% fat, 22.0% fiber, 1.1% ash, and 60.0% carbohydrates on a dry weight basis. Mineral analysis showed higher concentration of K followed by P, Mg, Ca and Na. Among the microelements, Fe was in higher concentration (7.4 mg/100 g dry weight) followed by Mn, Zn and Cu. Oleic (44.25%), lauric (17.35%), myristic (11.45%), palmitic (10.30%) and linoleic (8.45%) were the major fatty acids in date seed oil. Tryptophan (chemical score = 77) was the first limiting amino acid in date seed proteins (FAO/WHO, 1973). The average *in vitro* protein digestibility and calculated protein efficiency ratio values were 63.5% and 1.65, respectively, compared to 90% and 2.50 for ANRC-Casein. AA

PASSION FRUIT

- 3548 KUMAR (SD). Passion fruit: The fruit of the future for Indians. *Chem. Age India* 35(2); 1984; 99-100

The characteristics of the fruit, its chemical composition, products and by-products that could be prepared are discussed. KAR

CROWBERRY

- 3549 KARPPA (J), KALLIO (H), PELTONEN (I) and LINKO (R). Anthocyanins of Crowberry, *Empetrum nigrum* coll. *J. Food Sci.* 49(2); 1984; 634-6

BANANA

- 3550 BHARDWAJ (CL), JONES (HF) and SMITH (IH). A study of the migration of externally applied sucrose esters of fatty acids through the skins of banana, apple and pear fruits. *J. Sci. Food Agric.* 35(3); 1984; 322-31

Sucrose esters (¹⁴C labelled) were prepared and included in a fruit coating which inhibited ripening. The esters remained intact on the surface of bananas, apples and pears. The amount of sucrose esters in the coatings applied in the surface of fruits and of that migrating into the pulp have been determined and data provided. JVS

KIWI FRUIT

- 3551 FUKE (Y) and MATSUOKA (H). Studies on the physical and chemical properties of kiwi fruit starch. *J. Food Sci.* 49(2); 1984; 620-22, 627

PINEAPPLE

- 3552 ADISA (VA). Studies on nutritional requirements of the latent phase of *Ceratomyces paradoxa*. The pineapple soft rot pathogen in Nigeria. *Nahrung*. 27(10); 1983; 951-6

APPLE

- 3553 DATTA (AK) and MORROW (CT). Constitutive relationship for apple cortex under hydrostatic stress. *J. Food Sci.* 49(2); 1984; 623-7
Hydrostatic creep tests were run on cylindrical specimens of Rome Beauty apples to study the mechanical response. Volumetric strain was measured for different levels and durations of applied stress. The former was separated into recoverable, permanent, instantaneous, and time dependent components. A general constitutive relationship was developed from statistical analysis. A mechanical model was proposed to explain the strain response of the material. AA
- 3554 KIRKOV (G). Up-to-date machines and automats for processing of apples and pears. *Lebensmittelindustrie*. 30(8); 1983; 357-8 (German)
The design features of Bulgarian machines for the peeling, removal of core, and cutting of apples and pears have been explained. The results obtained by measurements during trial runs have been reported. The thermochemical peeling process as well as the coring and cutting aggregates are claimed to be highly effective, yielding an end-product of high quality. KMD
- 3555 JEWELL (WJ) and CUMMINGS (RJ). Apple pomace energy and solids recovery. *J. Food Sci.* 49(2); 1984; 407-10
Two unique apple pomace processing systems were found capable of converting the wasted residue into a beneficial resource. The first process anaerobically digested the pomace producing energy as biogas. Bench and pilot scale testing indicated that nearly 80% of the pomace organics could be converted into a substitute natural gas with an energy value of \$10- 30 per wet metric ton. The second process, called "biodrying", combined a high rate composting reactor with a low energy consuming dryer. Operation of a full scale biodrying system achieved wet pomace mass and volume reductions greater than 70% and produced a dried, stable, odourless product in less than 5 days. AA
- 3556 ANON. Singapore - Market survey for apples and potatoes. *Profdocil Bull.* 18(2&3); 28-30
The potential demand for the apples and potatoes in Singapore and the import from various countries are surveyed. Names and addresses of important importers are given. AA

MELON

- 3557 KING (RD) and ONUORA (JO). Effect of processing factors on some properties of melon seed flour. *J. Food Sci.* 49(2); 1984; 415-8
The effects of dry and moist heat on the solubility of the nitrogenous constituents and emulsifying activity of melon seed (*Colocynthis citrullus* Linn) flour were examined. A factorial experiment was then used to study the effects of temperature, moisture content, time of heating and pH on total soluble solids and the effects of temperature, moisture content and time of heating on colour development by the flour. In each case, a response function was fitted to the data; these were then used to examine

and time of heating on colour development by the flour. In each case, a response function was fitted to the data; these were then used to examine the action of these variables on the two responses. AA

SUGAR, STARCH AND CONFECTIONERY

SUGAR

- 3558 HIRAI (S) and YAMAZAKI (K). Analysis of sugar components of dried persimmon by gas chromatography. *J. Jpn. Soc. Food Sci. Technol.* 30(3);1983; 178-80 (Japanese)

Sugar components of "Ichida Kaki" (Japanese persimmon) before and after the process of drying were investigated by both gas chromatography and thin-layer chromatography. The sugar contents of persimmon determined by gas chromatography were identical with those by Bertrand method. Free sugars contained in the raw fruit were mainly fructose (39%), glucose (38%) and sucrose (23%). The amount of monosaccharides was extremely high in the free sugars of the dried fruit flesh, 51% of which was fructose followed by glucose (48%), whereas the amount of sucrose (1%) was very low. The sugar contents of white powder deposited on the fruit surface were analyzed in comparison with those of the dried fruit flesh and it was found that the ratio of fructose to the free sugar (22%) in the former case was lower than that of the latter (51%). AA

- 3559 MOLLER (G). Automation of the crystallization process in the sugar refinery at Gustrow. *Lebensmittelindustrie.* 30(8); 1983; 368-70 (German)

A Polish automat for the control of a discontinuous crystallization process in a beet-sugar factory has been described. The consequences of its installation in the boiling house, and in the boiling process have been pointed out. KMD

- 3560 LINDEN (G) and LORIENT (D). Saccharide composition of burnt sugars and its alteration during storage. *Starch.* 35(11); 1983; 400-402 (German)

High-pressure liquid chromatography of 22 samples of burnt sugar (caramel) taken from different manufactures, revealed a wide variation in their saccharide composition. There are great differences in glucose, fructose, and saccharose concentrations; 15 samples contained no saccharose. These differences have been explained by a hydrolysis of saccharose, and an isomerization of glucose. KMD

- 3561 NAWAR (SS) and NASR (FA). Treatment of sugar factory waste water by biochemical techniques. *Int. Sugar J.* 86(1023); 1984; 70-72

STARCH

- 3562 KOMAKI (T). Application of enzymes in starch saccharification industry. *J. Jpn. Soc. Food Sci. Technol.* 30(3); 1983; 181-9 (Japanese)

- 3563 HAKULIN (S), LINKO (Y-Y), LINKO (P), SEILER (K) and SEIBEL (W). Enzymatic conversion of starch in twin-screw HTST-extruder. *Starch.* 36(12); 1983; 411-4

- 3564 LEHMANN (G) and GOTTSCHLICH (H). Effect of emulsifiers on starch. *Fette Seifen Anstrichm.* 85(11); 1983; 439-43 (German)

The effect of emulsifiers on starch is generally explained by the formation of clatrates with amylose; The iodine-starch complex is also an inclusion compound of this type. Monoglycerides with different fatty acid residues are incorporated in different amounts. The occurrence of this reaction is explained: a) by a calculation of the radius of the fatty acids, and a comparison of the inner space within the helix, and (b) by the action of chaulmoogra acid monoglyceride upon amylose. KMD

NOUGAT

- 3565 SCHREIBER (P). Nougat masses and nougat. *Gordian.* 83(11); 1983; 224 (German)

The proportions of sugar and fat in various types of nougat masses and nougats have been reported. KMD

CHOCOLATE

- 3566 ANON. Chocolate craze growing. *J. Am. Oil Chem. Soc.* 61(3); 1984; 463-6

Out of 16 pounds of candy consumed by an American per year, 9 consists of chocolate. During 1979, two thirds of confectionery sales were accounted for by chocolates and chocolate products. People have become choosy regarding chocolates. One to 5 oz bar of milk chocolate is very popular in US supplies. According to recent figures about 2 billion pounds of chocolate like products are sold in U.S. Data have been provided on the import of cocoa beans/products and also exports of cocoa products. A brief account of the cocoa tree, harvesting of seeds processing and manufacture of cocoa products as also the material that go into chocolate manufacture have been provided. JVS

- 3567 YOUNG (CC). The interpretation of GLC triglyceride data for the determination of cocoa butter equivalents in chocolate: A new approach. *J. Am. Oil Chem. Soc.* 61(3); 1984; 576-81

The method is based on the straight line relationship existing between C₅₀ and C₅₄ triglycerides of different cocoa butters and the awareness that for available cocoa butter substitutes conforming to CAOBISCO's criteria. By using this method (which were triglyceride data obtained by GLC) the CBE present in a chocolate can be determined with an accuracy of $\pm 1.5\%$ when present at 5% level. The method described is graphical thereby facilitating use when microcomputer facilities are not available. JVS

- 3568 ANON. Confectionery fats - for special uses. *J. Am. Oil Chem. Soc.* 61(3); 1984; 468-72

A feature article which discusses the applications of cocoa in chocolate industry, properties of cocoa butter, substitutes for cocoa butter (also referred to as hard butters) and their applications, cocoa butter equivalent (CBE) or extenders, and lauric and nonlauric cocoa butter substitutes. JVS

BAKERY PRODUCTS

- 3569 BUNNIES (H) and TIMM (T). Use of milk protein products in baked goods. *Gordian*. 83(12); 1983; 248-53 (German)

The huge surplus of milk and skim milk powder that exists in Western Europe has led to attempts to find new uses for milk protein in foods of all kinds. New processing methods, like ultrafiltration and reverse osmosis, have presented in new types of products and also new types of uses for milk products. The authors have analyzed systematically the different ways by which more milk products can be introduced into baked goods of various types. KMD

- 3570 WOLT (MJ) and D'APPOLONIA (BL). Factors involved in the stability of frozen dough. I. The influence of yeast reducing compounds on frozen-dough stability. *Cereal Chem.* 61(3); 1984; 209-12
- 3571 WOLT (MJ) and D'APPOLONIA (BL). Factors involved in the stability of frozen dough. II. The effects of yeast type, flour type, and dough additives on frozen-dough stability. *Cereal Chem.* 61(3); 1984; 213-21

BREAD

- 3572 RANHOTRA (G), GELROTH (J), NOVAK (F), BOHANNON (F) and MATTHEWS (R). Proximate components in selected variety breads commercially produced in major U.S. cities. *J. Food Sci.* 49(2); 1984; 642-4, 646

Ten types of popular variety breads, up to four brands of each, were obtained from four major U.S. cities. All brands of each product from Chicago were analyzed separately; those from each of the other cities were composited. Unlike other products, tortillas contained moisture well in excess of 40%. Insoluble dietary fiber (DF) in 100% wholewheat averaged 5.68%. Protein in tortillas averaged only about 50% of the amount in other products. Fat in oatmeal, raisin, and wholewheat breads averaged about 4%. In contrast to DF and fat values, intra- and inter-city differences in moisture, ash, and to a lesser extent, protein values were minimal. Energy values averaged between 213 (tortillas) and 272 Kcal/100g (raisin bread). AA

- 3573 MANINDER (K) and JORGENSEN (OB). Interrelations of starch and fungal amylase in breadmaking. *Starch*. 35(12); 1983; 419-26

The interrelation of starch in flour and fungal α -amylase in breadmaking was investigated using a low protein and a high protein flour. Loaf volume and bread quality were improved by the fungal α -amylase supplements. Gel chromatography for elution of DMSO soluble starch fraction and the results of amylose and amylopectin contents revealed somewhat similar situation in the fresh bread which differed from the elution profiles of soluble fractions of 3 and 5 day old loaves prepared with and without α -amylase supplements. Decreased recovery of starch in the DMSO soluble fractions indicated some degree of retrogradation. The higher amylose contents of the 5-day old bread crumb soluble starch fraction indicated a change in amylose and amylopectin ratio. AA

COOKIE

- 3574 COOPER (HR), PATTEN (JD) and FLETCHER (RH). Effect of some insoluble milk proteins on sensory characteristics of appearance and texture in cookies. *J. Food Sci.* 49(2); 1984; 376-9, 392

CAKE

- 3575 EBELER (SE) and WALKER (CE). Effects of various sucrose fatty acid ester emulsifiers on high-ratio white layer cakes. *J. Food Sci.* 49(2); 1984; 380-83, 388
- 3576 SPINK (PS), ZABIK (ME) and UEBERSAX (MA). Dry-roasted air-classified edible bean protein flour use in cake doughnuts. *Cereal Chem.* 61(3); 1984; 251-4

MACARONI

- 3577 LUCISANO (M), CASIRAGHI (EM) and BARBIERI (R). Use of defatted corn germ flour in pasta products. *J. Food Sci.* 49(2); 1984; 482-4, 497
- Macaroni was produced from commercial durum semolina blended with 10, 20, and 30% defatted corn germ meal. Addition of corn germ meal resulted in longer mixing time of the dough, higher farinograph water absorption, higher protein content of the products and improvement of amino acids pattern. Optimum cooking time and percent increase in weight of cooked macaroni decreased with increasing levels of wheat substitution. Enrichment with germ flour had no effect on flavour and texture of conventional macaroni evaluated by taste panels; it greatly affected physical measurements of cooked product texture causing an increase of firmness. AA

MILK AND DAIRY PRODUCTS

MILK

- 3578 MOHR (K-H). Energy saving homogenization of milk. *Lebensmittelindustrie.* 30(8); 1984; 349-50 (German)
- 3579 UBERTALLI (A) and AMBROSOLI (R). Coagulation differences in sheep milk from suckling or milked ewes. *Ind. Aliment.* 22(12); 1983; 925-8 (Italian)
- 3580 JACOBBER-PIVARNIK (LF) and RAND (AG), Jr. Use of a milk assay to evaluate the effects of potassium on commercial yeast lactases. *J. Food Sci.* 49(2); 1984; 435-8, 445

A reliable enzyme assay was developed that could routinely be used to accurately reflect lactase activity. The assay was performed with a nonfat dry milk substrate at 37 C. This procedure was then utilized to evaluate the effects of potassium ions as a stabilizer and activator on four yeast lactase enzymes. Low levels of potassium ions (K^+), incorporated as potassium chloride (KCl), increased enzyme units by 20% and 30% in two liquid lactases derived from *Saccharomyces lactis*. Levels as high as 9.4% KCl

increased the activity of one liquid lactase as much as 160%. The K^+ activated and stabilized a powdered form of lactase isolated from *Kluyveromyces fragilis*. The activity of the fourth lactase tested, also derived from *S. lactis*, was slightly enhanced. AA

- 3581 PULUSANI (SR) and RAO (DR). Stimulation by formate of antimicrobial activity of *Lactobacillus bulgaricus* in milk. *J. Food Sci.* 49(2); 1984; 652-3

- 3582 MOLLER (T). Aflatoxin M_1 in Swedish milk. *Var Foda* 35(10); 1983; 461-5 (Swedish)

Contamination of milk and milk powder with aflatoxin M_1 has been investigated in two different studies. All the samples were taken during Spring 1983 from different parts of Sweden. 60 samples of milk and 24 samples of milk powder were analysed in a study carried out at the Swedish National Food Administration. One milk samples was positive for aflatoxin (level found 50-100 ng/l). In study, carried out by the Swedish Dairy Association a more sensitive analytical procedure was used and aflatoxin M_1 was detected in all the 13 milk samples analysed. The mean level found was 17 ng/l and the range 5-36 ng/l. The source of the aflatoxin M_1 contamination found in milk was probably aflatoxin-containing cottonseed and/or copra used in feeding stuffs. AA

WHEY

- 3583 JANSSENS (JH), BERNARD (A) and BAILEY (RB). Ethanol from whey: Continuous fermentation with cell recycle. *Biotechnol. Bioeng.* 26(1); 1984; 1-5

CHEESE

- 3584 OHASHI (T), NAGAI (S), MASAOKA (K), HAGA (S), YAMAUCHI (K) and OLSON (NF). Physical properties and microstructure of cream cheese. *J. Jpn. Soc. Food Sci. Technol.* 30(5); 1983; 303-7

Some cream cheeses commercially manufactured from fresh cream, whole milk and skim milk powder were examined for quality characteristics such as composition, physical properties and microstructure. Average yield of final products was 400 kg per 1000 kg of cheese milk. The mean compositions of all 21 samples were 0.92, 55.68, 33.32, 8.55 and 1.08% acidity, moisture, fat, protein and ash, respectively. Elastic modulus and adhesiveness of the cream cheese were estimated using 11 and 10 samples, respectively. The former averaged 15.46×10^6 dyne/cm², the latter 1.21×10^6 dyne/cm², indicating that these physical properties were liable to variation compared with chemical compositions. Scanning electron microscopy for examining the microstructure of these cream cheeses revealed that remarkable structural changes occurred during cheese making. A part of fat globules contacted the casein micelle aggregates forming amorphous clumps, while residues of fat globule fragments fused with one another and produced large clusters in every place. AA

ICE CREAM

- 3585 MATES (A).. Simple device for cleaning an ice cream scoop. *Dairy Food Sanit.* 3(8); 1983; 284-7

A simple device for cleaning scoop based on a siphon has been reported.

For cutting contamination rates in bulk ice cream fountain establishments, the importance and advantages of using the device has been discussed. BSN

MEAT AND POULTRY

MEAT

3586 HEDRICK (HB). Methods of estimating live animal and carcass composition. *J. Anim. Sci.* 57(5); 1983; 1316-27

3587 CHEN (CC), PEARSON (AM), GRAY (JI), FOOLADI (MH) and KU (PK). Some factors influencing the nonheme iron content of meat and its implications in oxidation. *J. Food Sci.* 49(2); 1984; 581-4

3588 MAC NEIL (MD). Choice of a prediction equation and the use of the selected equation in subsequent experimentation. *J. Anim. Sci.* 57(5); 1983; 1328-36

3589 HARTMAN (GJ), SCHEIDE (JD) and HO (C-T). Effect of water activity on the major volatiles produced in a model system approximating cooked meat. *J. Food Sci.* 49(2); 1984; 607-613

The effects of water activity (a_w) on the major volatiles produced from a meat flavour model system containing monosodium-L-glutamate, L-ascorbic acid, thiamin HCl and cystine was investigated. Quantitative and qualitative differences in volatiles produced between high and low a_w systems (heated at 135 C) were found. Qualitative changes were observed to occur at about a_w 0.4. Compounds identified in high and low a_w systems fell into classes which are associated with boiling and roasting cooking techniques (respectively) of known naturally occurring compounds. AA

3590 OBREtenov (T), KUNTScheva (M) and IVANOVA (S). Model studies on processes of melanoidine formation in meat. *Nahrung.* 27(10); 1983; 889-96 (German)

3591 KUNTScheva (M), IVANOVA (S) and OBREtenov (T). A method for quantitative determination of melanoidines from meat. *Nahrung.* 27(10); 1983; 897-900 (German)

A method for isolation of melanoidines from meat with a high degree of repeatability and relatively standard deviation of 1,2% is developed. It is based on the extraction of the melanoidines with distilled water from baked meat and their purification by dialysis and ion exchange chromatography on DEAE-cellulose. The isolated melanoidines are characterized by UV-, IR-spectra, elemental and gel-chromatographic analysis. AA

3592 SOMOV (G), IVANOVA (S), KUNTScheva (M) and OBREtenov (T). Model studies on processes of melanoidine formation in big portioned convenience meat products with a high degree of readiness. *Nahrung.* 27(10); 1983; 901-8 (German)

Processes of melanoidine formation in big portioned convenience meat products with a high degree of readiness are studied. The quantity of the formed melanoidines depends on the selected regime of technological treatment and is in a narrow correlation with the changes of colour of the culinary treated convenience meat products. It can be used as an indicator in controlling the quality of the convenience meat products with a high degree of readiness. AA

- 3593 LI-CHAN (E), NAKAI (S) and WOOD (DF). Hydrophobicity and solubility of meat proteins and their relationship to emulsifying properties. *J. Food Sci.* 49(2); 1984; 345-50
 Surface hydrophobicity (S_o) of crude salt extracts of meat was determined fluorometrically using cis-parinaric acid as a probe. Upon heating the extracts to 70 C, S_o increased two- to threefold, whereas protein solubility (s) decreased to 20%. Further heating (to 85 C) resulted in slight decreases in both S_o and s . Backwards stepwise multiple regression equations for prediction of emulsifying activity index (EAI) and emulsifying capacity (EC) were: $EAI = 2.658 + 0.0001308 sS_o$, and $EC = -35.30 + 6.459 s + 0.001317 sS_o - 0.05463 s^2$. sS_o was most important for predicting emulsifying properties of samples with high ($\geq 50\%$) solubility, whereas solubility parameters were more influential for samples with low ($< 50\%$) solubility. AA
- 3594 DAVIS (CE) and ANDERSON (JB). Effect of heat on biuret-positive water-extractable porcine muscle proteins. *J. Food Prot.* 46(11); 1983; 947-9, 953
- 3595 STEINHAUER (JE). Food phosphates for use in the meat, poultry and sea-food industry. *Dairy Food Sanit.* 3(7); 1983; 244-7
 Discusses: chemistry and nomenclature; basic chemical functions of phosphates; benefits/functions in food systems; red meat applications; sea food applications; and methods of applications. BSN
- 3596 PARISI (E) and GIACCONE (V). Problems concerning the microbiology of fresh meat: New findings. *Ind. Aliment.* 22(12); 1983; 945-52 (Italian)
 The latest literature on the microbiological condition of fresh meat has been reviewed. An attempt has been made to assemble the data in a concise synthesis useful to workers concerned with meat hygiene. KMD

BEEF

- 3597 SHAHIDI (F), NACZK (M), RUBIN (LJ) and DIOSADY (LL). Functional properties of blood globin. *J. Food Sci.* 49(2); 1984; 370-72
- 3598 ELKHALIFA (EA), ANGLEMIER (AF), KENNICK (WH) and ELGASIM (EA). Influence of prerigor pressurization on post-mortem beef muscle creatine phosphokinase activity and degradation of creatine phosphate and adenosine triphosphate. *J. Food Sci.* 49(2); 1984; 595-7
- 3599 RAUCH (P) and KAS (J). Phospholipid changes during storage of beef at 4 C. *Nahrung.* 27(10); 1983; 939-44
 The mean molecular weight of beef phospholipids, as measured experimentally, was 738 and the recalculation factor was 23.8. Total phospholipids decrease from 569 to 486 mg/100 g during storage for 14 days at 4 C. the contents of phosphatidylcholine, sphingomyelin, phosphatidylserine, and phosphatidylinositol also decrease; on the other hand, the lysophosphatide content increases, while the phosphatidylmethanolamine (PE) content increases temporarily. This temporary increase is due to enzymatic demethylation of phosphatidylcholine (PC). Changes in the PE/PC ratio in meat during the storage period have been recorded. KMD
- 3600 KREIGER (RA), SNYDER (OP) and PFLUG (IJ). A comparison of techniques for recovering *Bacillus subtilis* spores from inoculated meat substrates. *J. Food Sci.* 49(2); 1984; 366-9

Blender maceration, insonation, rotary shaker washing, and stomacher processing were initially evaluated as mechanical methods for bacterial spore recovery from inoculated beef substrates. Ionic dispersants (Daxads) and wetting agents were also evaluated for augmentation of spore recovery when used as sample diluents and processing vehicles. Spore recovery rates were shown to be affected by the spore inoculum titer, mechanical processing method, and diluent type ($p=0.001$). These experimental factors also demonstrated significant interactions affecting spore recovery. The best initial combination tested (blender-Daxad) only produced a recovery rate of 66%, with large variances in sample means when tested over a wide range of inoculum levels. This result prompted a posteriori test using a tissue homogenizer, which produced higher recovery rates than the blender, with stable variance over a wide range of inoculum levels. AA

CATTLE

- 3601 NOUR (AYM), THONNEY (ML), STOUFFER (JR) and WHITE (WRC) Jr. Changes in carcass weight and characteristics with increasing weight of large and small cattle. *J. Anim. Sci.* 57(5); 1983; 1154-65
- 3602 NOUR (AYM), THONNEY (ML), STOUFFER (JR) and WHITE (WRC) Jr. Changes in primal cut yield with increasing weight of large and small cattle. *J. Anim. Sci.* 57(5); 1983; 1166-72

BOVINE

- 3603 POWELL (VH), DICKINSON (RF), McPHAIL (NG), BOUTON (PE) and HARRIS (PV). Evaluation of extra low voltage electrical stimulation systems for bovine carcasses. *J. Food Sci.* 49(2); 1984; 363-5, 369
- 3604 ELKHALIFA (EA), ANGLEMIER (AF), KENNICK (WH) and ELGASIM (EA). Effect of prerigor pressurization on postmortem bovine muscle lactate dehydrogenase activity and glycogen degradation. *J. Food Sci.* 49(2); 1984; 593-4, 597
- 3605 DAVIS (CE) and ANDERSON (JB). Size exclusion/HPLC of heated water soluble bovine and porcine muscle proteins. *J. Food Sci.* 49(2); 1984; 598-602
- Proteins (280 nm absorbance) in water extracts from bovine semimembranosus and porcine longissimus were separated by size exclusion (SEC) high performance liquid-chromatography (HPLC). SEC/HPLC profiles showed six heat sensitive fractions $>10,000$ daltons. These fractions ranged from peak 1 at 375,800 daltons in bovine and 170,000 daltons in porcine down to myoglobin, peak 6, at 15,200 and 19,500 daltons for bovine and porcine, respectively. SEC/HPLC showed the loss of certain peaks at specific time/temperature treatments. Heat labile porcine proteins $> 10,000$ daltons represented about 41.5 area percent of the total extractable components after heating to 60 C. In bovine, this represented about 37.5 area percent. In both species, heating at 70 C for 30 minutes or at 75 C for 0 minutes resulted in protein solubility loss to about 1 area percent or less. AA

BEEF TALLOW

- 3606 GROMPONE (MA) and MOYNA (P). Characteristics of Uruguayan beef tallow. *J. Am. Oil Chem. Soc.* 60(7); 1983; 1331-2

MUTTON

- 3607 DENNIS (MJ), CRIPPS (GS), TRICKER (AR), MASSEY (RC) and McWEENEY (DJ). N-nitroso compounds and polycyclic aromatic hydrocarbons in Icelandic smoke cured mutton. *Food Chem. Toxicol.* 22(4); 1984; 305-6

Experimental data has been generated to suggest that in Icelandic smoke cured mutton, the smoking procedure is responsible for variations in polycyclic aromatic hydrocarbons and N-nitrosamines and that the curing is not important. JVS

LAMB MEAT

- 3608 CROUSE (JD), FERRELL (CL) and CROSS (HR). The effects of dietary ingredients, sex and slaughter weight on cooked meat flavour profile of market lamb. *J. Anim. Sci.* 57(5); 1983; 1146-53

PORK

- 3609 THEILER (RF), SATO (K), ASPELUND (TG) and MILLER (AF). Inhibition of N-nitrosamine formation in a curd ground pork belly model system. *J. Food Sci.* 49(2); 1984; 341-4
- 3610 SCHAEFER-SEIDLER (CE), JUDGE (MD), COUSIN (MA) and ABERLE (ED). Microbiological contamination and primal cut yields of skinned and scalded pork carcasses. *J. Food Sci.* 49(2); 1984; 356-8
- 3611 NAKAMURA (T), NUMATA (M), YOSHINO (Y) and ITOSAWA (K). Application of dried plasma to processed meat products. *J. Jpn. Soc. Food Sci. Technol.* 30(5); 1983; 283-9 (Japanese)

Recently, increasing attention is paid to effective utilization of animal blood in Japan. Processed meat products such as pork sausage, hamburger steak and smoked pork loin which contained dried pork plasma of four commercial brands were manufactured and evaluated for their quality and acceptability. The results showed that the quality of pork sausage and hamburger steak was not affected so much by the replacement of meat with approximately 10% plasma (as the weight after rehydration with four times of water) and that smoked pork loin could be added with approximately 1% plasma without marked changes in quality. However, the application of dried plasma slightly caused unfavourable effects on the texture of the products. This may be due to the insufficient gel formation of plasma which was supposed to be attributable to the low plasma content and the low heating temperature under the present manufacturing conditions. The acceptability of the products, especially flavour, was affected significantly depending on the brand of dried plasma. AA

BACON

- 3612 MANDAGERE (AK), GRAY (JI), SKRYPEC (DJ), BOOREN (AM) and PEARSON (AM). Role of woodsmoke in N-nitrosothiazolidine formation in bacon. *J. Food Sci.* 49(2); 1984; 658-9, 661

The role of woodsmoke in N-nitrosothizaolidine (NTHZ) formation in bacon was investigated in model systems in which woodsmoke condensate was reacted with combinations of nitrite and cysteamine, cysteine, or cystine. NTHZ formation was most pronounced in those systems containing nitrite and cysteamine. When the smoke condensate was treated initially with sodium bisulphite before reaction with nitrite and cysteamine, only trace amounts of the N-nitrosamine were obtained. Pork bellies at various stages of processing and cooking were also analyzed for NTHZ. Higher levels of NTHZ were found in raw pork belly which had been cured and smoked than in the fried counterpart. AA

- 3613 OSTERDAHL (B-G) and OLSON (I) Volatile nitrosamines in bacon, pork and other meat products. *Var Foda*. 35(10); 1983; 440-50 (Swedish)

One hundred twenty-one samples of meat products were analysed in 1980-1982 for volatile n-Nitrosamines. NDMA was demonstrated in 89 of the 121 samples studied, whilst NPYR was found almost exclusively in fried bacon and pork. NPIP was found in a few samples and NDBA in smoked chicken only. The highest levels of volatile N-nitrosamines were found in fried bacon, where the mean content was $12.9 \mu\text{g/kg}$. The cooked-out fat contained the same level of volatile n-nitrosamines as fried bacon. Frying bacon in a pot with lid gave a higher level of volatile n-nitrosamines than frying in a frying pan. On the other hand, the level of volatile nitrosamines was not increased by using a splash screen. AA

SAUSAGE

- 3614 RAO (LO), DRAUGHON (FA) and MELTON (CC). Sensory characters of thuringer sausage extended with textured soy protein. *J. Food Sci.* 49(2); 1984; 334-6
- 3615 TREVORS (KE), HOLLEY (RA) and KEMPTON (AG). Effect of bacteriophage on the activity of lactic acid starter cultures used in the production of fermented sausage. *J. Food Sci.* 49(2); 1984; 650-51, 653

Bologna

- 3616 NIELSEN (HJS) and ZEUTHEN (P). Influence of phosphate and glucose addition on some important spoilage bacteria in vacuum packed bologna-type sausage. *J. Food Prot.* 46(12); 1983; 1078-83

FRANKFURTER

- 3617 WHITING (RC), BENEDICT (RC), KUNSCH (CA) and WOYCHIK (JH). Effect of sodium chloride levels in frankfurters on the growth of *Clostridium sporogenes* and *Staphylococcus aureus*. *J. Food Sci.* 49(2); 1984; 351-5
- 3618 KROLL (J), GASSMANN (B), and HEINEVETTER (L). Relations between the water uptake of powdery protein raw materials and the cooking loss of sausages of the frankfurter type substituted with them. *Nahrung*. 27(10); 1983; K25 (German)
- 3619 KROLL (J), GWIAZDA (S), GASSMANN (B), HOPPE (K) and KROCK (R). Test systems in evaluating meat protein-substitutes for sausages of the frankfurter type. Part 2. Scale comparison and simplification. *Nahrung*. 27(10); 1983; 1009-14 (German)

POULTRY

- 3620 GUPTA (AK) and CHAWLA (RS). Management of big poultry farms. *Poult. Guide.* 21(9); 1984; 29-31
- 3621 SINGH (R) and SINGH (RI). Poultry enterprise in rural area. *Poult. Guide.* 21(9); 1984; 33-35
- 3622 VIRK (RS), SIKKA (SS) and ICHHPONANI (JS). Twenty point economic programme in poultry. *Poult. Guide.* 21(9); 1984; 39-43

CHICKEN

- 3623 KITADA (Y), HASUIKE (A), SASAKI (M), TANIGAWA (K), HORIUCHI (R) and YUBA (H). Analysis and behaviour of ATP related substances in chicken muscle. *J. Jpn. Soc. Food Sci. Technol.* 30(3); 1983; 151-4 (Japanese)

A simple, rapid method has been developed for determining adenosine triphosphate (ATP), adenosine diphosphate, adenosine monophosphate, inosinic acid (IMP), inosine, and hypoxanthine in chicken muscle. The determination was carried out by high performance liquid chromatography using a ultraviolet monitor. In this method, average recovery values added to chicken muscle were in the range of 93.5 ~ 100.5%. Samples were obtained from "Yamato" and "Broiler" type chickens that were raised in the experiment station. The results indicated that IMP was distributed in breast, thigh, and neck muscles, whereas it was not found in skin and edible viscera. IMP content increased according to the age of the birds. At higher temperature, IMP quickly decreased and value obtained by quantitative changes of ATP related substances increased contrary to IMP. However, IMP and K value did not change significantly for a month at -15 C. An investigation of the changes of IMP and K value by cooking revealed that IMP content markedly decreased by boiling and K value slightly increased by frying. AA

BROILER

- 3624 GREY (TC), ROBINSON (D), JONES (JM), STOCK (SW) and THOMAS (NL). Effect of age and sex on the chemical composition of edible offal and blood from broilers. *Br. Poult. Sci.* 25(1); 1984; 83-90
- 3625 ANG (CYW), YOUNG (LL) and WILSON (R). Interrelationships of protein, fat and moisture content of broiler meat. *J. Food Sci.* 49(2); 1984; 359-62
- Nutrient composition data of broiler tissues were statistically evaluated for any significant relationships between and among the four major components, moisture (M), protein (P), fat (F) and ash (A). The ratios of M/P, F/M, and P/F were generally characterized by broiler part. Estimations of fat and protein from moisture content were applicable within each part of each reported data set. Multiple correlation coefficients among P, F and M were high regardless of part or cooking status. The total of these three major components accounted for approximately 99% of the tissue weight with slight variations between laboratories. The results support the method for estimating of P by subtracting the F and M from 99% or other values established by each laboratory. AA
- 3626 ANG (CYW), JUNG (HC), BENOFF (FH) and CHARLES (OW). Effect of feeding three levels of riboflavin, niacin and vitamin B₆ to male chickens on the nutrient composition of broiler breast meat. *J. Food Sci.* 49(2); 1984; 590-92, 602

Sixty day-old male chicks were fed three rations differing in riboflavin (R), vitamin B₆, and niacin (N) content. The three rations were: (1) an adjusted basal ration containing R, B₆ and N 10% above National Research Council recommendations, (2) a ratio containing 75% of the 3 vitamins as in (1), and (3) with 125% of the 3 vitamins as in (1). Birds were grown for 51 days and the breast meat harvested and analyzed for proximate composition, 3 vitamins and 9 minerals. No significant differences in the nutrient content of meat were found attributable to the dietary treatments. Results indicated that broiler meat composition was fairly constant even though birds consumed wide differences in R, B₆ and N. AA

TURKEY

- 3627 AGGARWAL (GK). Breeding turkey for economic efficiency meat. *Poult. Guide*. 20(5); 1983; 59-63

EGG

- 3628 MANDLEKAR (SM) and THATTE (VR). Factors affecting fertility and hatchability of chicken eggs. *Poult. Guide*. 21(5); 1983; 65-70
- 3629 RAMAKRISHNA RAO (DN) and MAHADEVAN (S). Comparative studies of protein components of hen's egg α - and β -lipovitellins. *Indian J. Biochem. Biophys.* 20(6); 1983; 344-8

α - and β -lipovitellins isolated from the yolks of white plymouth rock and white leghorn eggs differed in their proportions among the two strains. Protein components separated by Sephadex G-200 chromatography showed that α -lipovitellin gave two fractions (α_1 and α_{11} -fractions). Similarly, β -lipovitellin also gave two fractions (β_1 and β_{11}). α_1 and β_1 fractions contained several high molecular weight proteins which α_{11} and β_{11} fractions were single proteins with molecular weight of 30,000 daltons each. There were differences between these two proteins in their amino acid composition, phosphorus and sialic acid contents which are discussed. BSN

- 3630 RAMAKRISHNA RAO (DN). Lipid binding studies with APO-C protein of hen's egg yolk very low density lipoprotein. *Indian J. Biochem. Biophys.* 20(6); 1983; 1392-4

A lipid-protein was yielded egg recombination of apo-C protein and egg yolk lecithin (ELG) and a mixture of ELG plus triolein. Both had a higher helical content than the very low density lipoproteins. The nature of lipid-protein interaction has been discussed based on the chemical composition of these complexes and amino acid sequence of apo-C protein. MVG

SEAFOODS

- 3631 GILL (TA) and THOMPSON (JW). Rapid, automated analysis of amines in seafood by ion-moderated partition HPLC. *J. Food Sci.* 49(2); 1984; 603-6

A direct method was developed for the determination of seafood amines. The method utilizes the principle of ion-moderated partition high performance liquid chromatography (HPLC). The method involves the extraction of muscle tissue in perchloric acid (PCA) and the subsequent chromatography of the neutralized PCA extract using dilute pH 11.0 sodium hydroxide as

elution solvent, the entire procedure requiring approximately 30 minutes to complete. The biogenic amines (histamine, putrescine and cadaverine) were separated and the method compared with an existing HPLC procedure. Trimethylamine and dimethylamine were also determined by this method. Results compared favourably with data obtained by existing colorimetric procedures used for the determination of these compounds.

- 3632 DUNCAN (A), ELLINGER (GM) and GLENNIE (RT). Determination of methionine by gas-liquid chromatography methods for the elimination of an interfering component present in some fresh meats. *J. Sci. Food Agric.* 35(4); 1984; 385-8

A method had been described earlier for measuring methionine as methyl thiocyanate released from CNBr reaction of intact proteins. It could not be applied to fish proteins, because of an unidentified component which interfered with the GLC determination of methionine. A method was developed to eliminate this interference and allow methionine determinations to be carried out using the same GLC technique. JVS

- 3633 AJMAL KHAN (S). Importance and efficacy of seafood. *Seafood Export J.* 16(7); 1984; 5-7

- 3634 RAYUDU (CS). Economics of fisheries - a case study of Andhra Pradesh. *Seafood Export J.* 15(5); 1983; 5-11

FISH

- 3635 WAGNER (H) and WALTER (JH). On the sorting of salt-water fish according to species. Part 1. The statistical geometrical definition of a fish species. *Lebensmittelindustrie.* 30(8); 1983; 375-6 (German)

First, the need to sort salt-water fish according to species is brought out, and the usual biological characteristics of different species have been briefly mentioned. For automatic sorting, however, a statistical geometric definition of the fish species is required. The shape of the back line, extending from the tip of the mouth to the base of the tail has been proposed as a suitable criterion for sorting of marine fish according to species. KMD

- 3636 MIKI (H) and NISHIMOTO (JI). Kinetic parameters of freshness-lowering and discolouration based on temperature dependence in fish muscles. *Bull. Jpn. Soc. Sci. Fish.* 50(2); 1984; 281-5

Reports the investigation on the rates of freshness-lowering and discolouration in fish muscles by using chemical indexes and mutmyoglobin formation and their kinetic parameters as affected by storage from -40 to +20 C. KAR

MACKEREL

- 3637 HASHIGUCHI (M), MATSUMOTO (F) and TSUYUKI (H). Relationship between K value and oxidation of lipids in two kinds of mackerel meat during storage at different low temperatures. *J. Jpn. Soc. Food Sci. Technol.* 30(3); 1983; 155-61 (Japanese)

K values and the oxidation states (values of AV, POV, COV and TBA V) of total lipids of dorsal ordinary meat of mackerel, *Scomber japonicus* and frigate mackerel, *Auxis tapeinosoma* under low temperature preservation

(+5 C cold storage, -3 C partial freezing and -20 C freezing) were measured and these samples were subjected to sensory tests. In case of +5 C cold storage, K values, AV, POV, COV and TBA V of both fish stored for 2 days were low and the sensory tests also gave good results, therefore, both fish were found to be edible as slices of raw fish ("Sashimi"). After cold storage for 4 days, K value, AV, COV and TBA V were a little higher, but POV was low and the results of the sensory tests were a little inferior, so both fish were edible when cooked. In the cold storage for 6 days, K value reached to 60% (the first rotten stage), and AV, COV, TBA V also became remarkable high values but POV was not so high, and the results of sensory tests were not good. Consequently both fish were not suitable for eating. In case of -3 C PF storage, K value, AV, POV, COV and TBA V of both fish stored for 10 days were low and the results of sensory tests were also good, therefore, both fish were found to be edible as "Sashimi". In the PF storage for 20 days, K value and AV went up a little high, and POV, COV, TBA V were not high enough. The results of the sensory tests were a little inferior, therefore, both fish were edible when cooked. In case of -20 C freezing storage, K value, POV, TAB V of both fish stored for 60 days were not too high, but AV and COV showed high value, and the results of sensory tests were good. Thus both fish were found to be edible as "Sashimi". AA

- 3638 SAKAGUCHI (M), MURATA (M) and KAWAI (A). Changes in free amino acid contents in juvenile mackerel *Scomber japonicus* muscle during ice storage. *Bull. Jpn. Soc. Sci. Fish.* 50(2); 1984; 323-9

In white muscle, during storage for 40 days volatile base-nitrogen rapidly increased in level after about 20 days, but not in dark muscle. Most free amino acids, except histidine and tourine, increased in level to certain extent throughout the storage period. Creatinine was present in a higher concentration in the white than in the dark muscle, but its level did not change during storage. KAR

POLLACK

- 3639 BABBITT (JK), KOURY (B), GRONINGER (H) and SPINELLI (J). Observations on reprocessing frozen Alaska pollack (*Theragra chalcogramma*). *J. Food Sci.* 49(2); 1984; 323-6
- 3640 OKAZAKI (E), TSUKADA (K), KANNA (K) and SUZUKI (T). Changes of properties of meat-textured fish protein concentrate during frozen storage. *Bull. Jpn. Soc. Sci. Fish.* 50(2); 1984; 307-12 (Japanese)

Meat textured fish protein concentrate (MT-FPC) from Alaska pollack was rehydrated and stored at -10 C or -20 C for 20, 40, 60, 90 and 120 days. At each storage period, the MT-FPC was thawed at 5 C and the changes of the properties were measured. No change occurred in colour, pH and odour; only water holding capacity was decreased during storage. The result showed that the rehydrated and frozen MT-FPC can be used as a food material satisfactorily in spite of physical changes during frozen storage. KAR

KRILL

- 3641 VARSHAL (GM), SAVINOVA (EN), SEDYKH (EM), SOROKINA (EV), PETROVA (NA), PIVOVAROV (PP), PERTSEVOI (FV), VALKOVSKII (DG), VAINERMAN (ES) and ROGOSHIN (SV). Characteristics of the mineral composition of isolated krill proteins *Nahrung.* 27(10); 1983; 945-9

The micro-element composition of krill protein, obtained by alkaline extraction, has been studied. The ash content was found to be fairly constant in the protein isolate prepared from different lots of krill. It was also demonstrated that isolated krill proteins are a good source of biologically essential micro-elements. The contents of fluorine and heavy metals were within permissible limits, and hence do not restrict the use of krill protein isolate in foods. KMD

CARP

- 3642 ISO (N), MIZUNO (H), SAITO (T), OHZEKI (F) and YANG (LC). Studies on the rheological properties of heated carp meats. *Bull. Jpn. Soc. Sci. Fish.* 50(2); 1984; 349-53

MULLET

- 3643 LEE (CM) and TOLEDO (RT). Comparison of shelf-life and quality of mullet stored at zero and subzero temperature. *J. Food Sci.* 49(2); 1984; 317-22, 344

The shelf-life and quality of mullet (*Mugil* spp.) caught off the Southeast Atlantic coast were evaluated during storage at subzero temperature (-2C) either unpackaged or vacuum packed in iolon film. Subzero temperature was maintained by storing fish in either 2% NaCl- or 7% propylene glycol-ice. Shelf-life of fish stored in -2 C ice was 10 days, compared to 7 days for the fish stored in 0 C ice. Extension of shelf-life was attributed to delayed microbial growth and slow biochemical changes. Structural changes due to ice crystals at subzero temperature storage appeared to be minor compared to those which occurred during freezing at -20 C as revealed by microscopic examination. AA

KAMABOKO

- 3644 OKU (T). The amino acid content of gamma-irradiated fried Kamaboko and the change during storage. (Changes in the components of gamma-irradiated fried Kamaboko Part I). *J. Jpn. Soc. Food Sci. Technol.* 30(3); 1983; 145-50 (Japanese)

In order to examine the changes in the amino acid content of fried Kamaboko (fried fish cake) by gamma-irradiation and by storage, samples of fried Kamaboko and its extractives were analysed using amino acid analyzer. Fried Kamaboko was prepared mainly from frozen ground Alaska pollack, packed and sealed under air in a cellophane film bag coated with polyvinyl-chloride. It was irradiated with a dose of 3 kGy and subsequently stored at 10 C for 56 days and 30 C for 21 days. Eighteen individual amino acids of fried Kamaboko showed no loss as a result of irradiation. A small quantity of methionine sulphoxide and sulphone was formed by irradiation. The total bacterial count per g of the irradiated sample was 30 before storage, and it was $10^4 \sim 10^6$ after 6~7 days at 30 C and over 10^7 after 14 days. The reduction of the total amino acid content (TAAC) of the irradiated sample was negligibly small after 14 day and about 4.5% after 21 days. The TAAC of the extractives increased rapidly up to 3.5 times of the initial values. During 56 days storage at 10 C, there was no apparent change in the TAAC of the irradiated sample and also of the extractives. The combined treatment of irradiation and low temperature storage was found to be fairly effective. AA

SHRIMP

- 3645 MCCOID (V), MIGET (R) and FINNE (G). Effect of environmental salinity on the free amino acid composition and concentration in penaeid shrimp. *J. Food Sci.* 49(2); 1984; 327-30, 355

White shrimp, *Penaeus vannamei*, kept in laboratory aquaria at a salinity of 35 parts per thousand (ppt) were subjected to increased and decreased salinity changes by either 5, 15 or 25 ppt. Shrimp were periodically removed from the aquaria and analyzed for total free amino acid nitrogen and also specific free amino acid composition. Decreasing salinities resulted in corresponding decreases in free amino acid concentration; minimum values were reached after 24-48 hours. Increasing salinities were likewise shown to result in corresponding increases in the tissue free amino acid concentration with maximum values being reached in 24 hours. Glycine, proline, arginine, serine/threonine, and alanine were the most significant contributors, comprising from 93-96% of the total free amino acid pool.

OYSTER

- 3646 CHAI (T), PACE (J) and COSSABOOM (T). Extension of shelf-life of oysters by pasteurization in flexible pouches. *J. Food Sci.* 49(2); 1984; 331-3

Combination of chlorination, packaging in flexible pouches, heating, cooling and cold storage could extend shelf-life of oysters from 2 weeks to 3 months. Freshly shucked oysters were first blown (or washed) in aerated chlorinated water, drained and vacuum sealed in flexible pouches. Pouched oysters were heated in two successive water baths for appropriate thermal treatment. After cooling in ice water, the products were stored at 0.5 C. Sensory tests performed immediately after pasteurization indicated that the pasteurized oysters were similar to freshly shucked oysters. Both aerobic and facultatively anaerobic bacterial counts were drastically decreased after pasteurization. Chemical changes during treatment and storage were determined and are discussed. AA

PROTEIN FOODS

Nil

FRUIT JUICES AND BEVERAGES

- 3647 GREILING (B) and MAIWALD (H-J). Estimation of the carcinogenicity of non-alcoholic beverages. *Ernährungsforschung*. 28(6); 1983; 173-174 (German)

The percent, annual consumption of non-alcoholic beverages in the GDR has increased from 35.8 l in 1968 to 86.5 l in 1981. This increase is to be attributed mainly to the increase in the consumption of lemonades and colas which lead to acid formation on the dental plaque. This is a dangerous trend, especially as even children are served lemonade and colas at breakfast and supper. It is desirable to recommend drinks which do not lead to acid formation on the dental plaque, and the industry must produce beverages of low sucrose content for use during the intervals when milk is served to children. KMD

FRUIT JUICES

- 3648 BORRMANN (K). Pasteurization technique used for pulpy juices. *Flussiges Obst.* 50(10); 1983; 554-6, 558-62 (German)

- 3649 TUMP (J). New ways of fruit juice treatment by ultrafiltration. *Flussiges Obst.* 50(10); 1983; 550-51, 553 (German)

Compared to traditional procedures, ultrafiltration has some significant advantages with regard to fruit juice clarification. Various juice producers have become aware of this fact and consequently substituted ultrafiltration for conventional filtration. Juices and concentrates obtained through ultrafiltration are of excellent quality. AA

- 3650 RIEB (S). Packaging, commission, provision-examples from a large fruit juice plant. *Flussiges Obst.* 50(10); 1983; 589-91 (German)

CASHEW APPLE JUICE

- 3651 VILASACHANDRAN (T), GOPIKUMAR (K) and ARAVINDAKSHAN (M). Storage studies on cashew apple juice. *Indian Cashew J.* 15(4); 1984; 9-11, 14

STRAWBERRY

- 3652 KUHIMANN (F). Amino acid composition of strawberry and raspberry juices *Flussiges Obst.* 50(10); 1983; 546-8 (German)

The composition of free amino acids in home-pressed raspberry and strawberry juices is given, and the possibility of commercial products; being adulterated is mentioned. AA

GRAPE JUICE

- 3653 MONK (PR) and COSTELLO (PJ). Measurement of yeast growth in grape juice with a fibre optic nephelometer. *J. Gen. Appl. Microbiol.* 29(6); 1983; 467-75

A fibre optic nephelometer was evaluated for use in measuring yeast cell numbers during the aerobic growth of yeast in grape juice. The response of the nephelometer to yeast cells in suspension decreased with increasing sugar concentration, and the decrease was dependent on the yeast population. Yeast cell number could be corrected from the observed nephelometer response with a calibration factor dependent on sugar concentration. Yeast populations as determined from the nephelometer response were compared to those determined by haemocytometer and optical density. AA

- 3654 OHTA (H), TONOHARA (K), NAITOH (T), KOHONO (K) and OSAJIMA (Y). Effect of temperature of colour of concord grape juice. (Studies on qualities of grape juice. Part. X). *J. Jpn. Soc. Food Sci. Technol.* 30(5); 1983; 290-95 (Japanese)

The influence of temperature on the colour of 10 ~30% Concord grape (*Vitis labrusca* L.) juice products was studied. Pale purple grape juice at room temperature (25 C) became dark purple and turned turbid at low temperature (5 C). The colour density at 520 nm of grape juice increased with the fall of temperature. The increment of absorbance at 520 nm of malvidin-3,5-diglucoside solution with the change from 32 C to 7 C corres-

ponded to the enrichment of absorbance with the decrease of 0.2 pH units in pH range 1.0~3.0. However, the pH change with temperature did not explain the enrichment of absorbance accompanied by pH change. Potassium and tartaric acid were qualitatively detected in the precipitate separated from grape juice (pH > 3.2) at low temperature. aAA

- 3655 WURDIG (G), MULLER (Th) and FRIEDRICH (G). Analysis of tartrate stability in grape juices by means of the saturation temperature. *Flussiges Obst*. 50(10); 1983; 564-8 (German)

For each type of grape juice, there exists a temperature on which the concerned juice is just saturated with tartar. This saturation temperature is in a close relation to the tartrate stability. The instability of the juice increases with increasing saturation temperatures. Several methods for the determination of the saturation temperature are described and the necessary computing formulas are given. By means of some examples the relationship that exists between the saturation temperature and the tartrate stability of grape juice has been demonstrated. BSN

APPLE JUICE

- 3656 SPAYD (SE), NAGEL (CW), HAYRYNEN (LD) and DRAKE (SR). Colour stability of apple and pear juices blended with fruit juices contained anthocyanins. *J. Food Sci.* 49(2); 1984; 411-4

Apple and pear juices blended with anthocyanin pigmented juices developed haze and colour stability during commercial marketing. To determine factors contributing to these problems, juice from apple and d'Anjou pear (prepared from whole fruit) and 'Bartlett' pear (peels and cores) were blended with 5, 10, 20% 'Concord' grape, 'Bing' cherry, or red or black raspberry juice. During storage at 25 C for up to 48 weeks, turbidity, polymeric colour, and % colour due to tannin increased, while anthocyanin concentration decreased. As % anthocyanin pigmented juice increased, turbidity and polymeric colour increased and % colour due to tannin decreased. Within a given base juice, turbidity was highly correlated with polymeric colour ($r = 0.78$ to 0.97). AA

- 3657 ROLAND (JO) and BEUCHAT (LR). Biomass and patulin production by *Byssoschlamys nivea* in apple juice as affected by sorbate, benzoate, SO₂ and temperature. *J. Food Sci.* 49(2); 1984; 402-6

The effects of potassium sorbate, sodium benzoate, SO₂ and incubation temperature on biomass and patulin production by *Byssoschlamys nivea* in apple juice were determined. Growth at 21, 30 and 37 C over a 25-day incubation period was significantly retarded by 75 ppm SO₂, 150 ppm potassium sorbate and 500 ppm sodium benzoate. Biomass accumulated to approximately 500 mg/100 ml in control samples of apple juice. Patulin was produced in the highest concentrations at 21 C after 20 days incubation. After reaching a maximum concentration at 30 and 37 C, a rapid decline in patulin content was observed. Patulin production was also observed at 12 C. On the basis of concentration, SO₂ had the most significant effect on the rate of biomass and patulin production by *B. nivea* followed by potassium sorbate and sodium benzoate, respectively. AA

COFFEE

- 3658 ITO (H), SHIMODA (M) and OSAJIMA (Y). Headspace gas chromatographic method using the internal standard for determination of aroma of roast and ground coffee. Effect of particle size and roasting degree. (Studies on aroma of coffee Part II). *J. Jpn. Soc. Food Sci. Technol.* 30(3); 1983; 133-9 (Japanese)

The internal standard method for gas chromatography of the aroma of roast and ground coffee is affected by the absorbing ability of ground coffee. The ground coffee consisted of particle sizes between 20~28 mesh and showed maximum amount of aroma components. The peak height of internal standard (I.S.) decreased according to smaller particle size. The peak height of I.S., however, was able to be corrected by the surface area calculated from particle size and its distribution because the high correlation observed between them (coefficient of correlation = -0.974). In comparing the results of gas chromatographic analysis of roast coffee in six degrees, the peak height of I.S. decreased as roasting, but the high correlation (coefficient of correlation = 0.965) was observed between the peak height of I.S. and L value. As a result of the correction of the peak height of I.S. by the L value, this internal standard method could apply to the coffee beans having different roasting degrees. It was suggested that the ratio of peak 5, acetaldehyde, to peak 8, isobutyraldehyde, was an useful index of roasting and variation of quality of coffee. AA

- 3659 LIONE (A), ALLEN (PV) and SMITH (JC). Aluminium coffee percolators as a source of dietary aluminium. *Food Chem. Toxicol.* 22(4); 1984; 265-8

Aluminium content in coffee brewed in aluminium percolators was measured by atomic absorption spectrometry. Brewing and subsequent storage were found to add 0.88 and 1.18 mg aluminium to coffee. Sixty one per cent of aluminium in percolated coffee was dialysable immediately after brewing. JVS

TEA

- 3660 HAZARIKA (M) and MAHANTA (PK). Compositional changes in chlorophylls and carotenoids during the four flushes of tea in North East India. *J. Sci. Food Agric.* 35(3); 1984; 298-303

Chlorophylls A and B, and carotenoids, namely, beta-carotene, butein, violaxanthine and neoxanthine were estimated in 4 flushes during April to October 1982. Marked changes were observed in these pigment constituents, throughout the plucking period; these changes were found to affect the sensory qualities of black tea. JVS

DATE WINE

- 3661 ALI (MZ) and DIRAR (HA). A microbiological study of Sudanese date wines. *J. Food Sci.* 49(2); 1984; 459-60, 467

Two wines, 'sherbote', and 'nabit' prepared from date syrup, are produced by a relatively quick fermentation taking about 36-48 hours. The fermentation of the third wine, 'dakkai', prepared from whole date fruits, is a slow process taking about 96 hours. The small amounts of spices and sorghum malt used as additives in the preparation of 'sherbote' and 'nabit', respectively, contribute to the inoculum. In 'dakkai', fermentation of the inoculum comes from the natural flora of the date fruit itself.

Changes in the production of ethanol, acetic and lactic acids and pH as well as in microbial populations were followed during fermentation of each wine. The most important genera of yeast, acetic and lactic acid bacteria were identified. AA

BEER

- 3662 DOBLER (H) and HEIDRICH (G). Investigations on the removal of chilling cloudiness from beer wort. *Lebensmittelindustrie*. 30(8); 1983; 359-61 (German)

The results of laboratory studies were successfully applied to counteract cloudiness in chilled beer in two breweries. A flotation process for removing cloudiness has been described. KMD

- 3663 KARSTENS (W) and WESENBERG (J). Investigations on the development of shelf-life of beer during the summer season. *Lebensmittelindustrie*. 30(8); 1983; 363-7 (German)

The seasonal fluctuations in the shelf-life of a beer made in a brewery having an accelerated fermentation and maturation process have been explained. The keeping quality of two standard products (lager beer, and German Pilsner) was adversely affected by an extraneous yeast infection. Rising outdoor temperatures increased the contamination level in every production department. The barrel and tank filling station was most seriously affected. The effect was further accentuated when the capacity limits of the filtration, cleaning, and disinfection departments were reached; reduced bittering and increased oxygen content also produced adverse effects. Sheet filters and HTST heaters could counteract the infection. KMD

- 3664 FUKAL (L), KAS (J) and RAUGH (P). Inactivation of papain proteolytic activity in the presence of ascorbic acid and Cu^{++} ions. *J. Inst. Brew.* 90(2); 1984; 73-6

The simultaneous presence of ascorbic acid, Cu^{++} ions and oxygen causes reversible inactivation of proteolytic activity of papain. Low concentrations of ascorbic acid and Cu^{++} ions have no effect on their own. Ascorbic acid at concentrations higher than $2 \times 10^{-4}\text{M}$ inactivates papain irreversibly in the presence of Cu^{++} ions. Papain inactivation is not accompanied by the destruction of papain molecules. Irreversible papain inactivation does not occur in solutions free of oxygen and the intermediates of ascorbic acid oxidation, i.e. dehydroascorbic acid and hydrogen peroxide, do not cause papain inactivation. The irreversible inactivation of papain is most probably due to free radicals formed during ascorbic acid oxidation. Owing to the possible occurrence of both ascorbic acid and Cu^{++} ions in beer, partial irreversible inactivation of papain can be expected even at a very low oxygen concentrations. AA

- 3665 HEJGAARD (J). Gene products of barley chromosomes 4 and 7 are precursors of the major antigenic beer protein. *J. Inst. Brew.* 90(2); 1984; 85-7

Proteins in grains of wheat-barley chromosome addition lines and in a protein-enriched concentrate from beer (fraction X) were compared by tandem crossed immunoelectrophoresis. Two major beer proteins, called Antigen 1a and 1b, were found to be products of distinct structural genes positioned on barley chromosomes 4 and 7, respectively. AA

- 3666 MANDENIUS (CF), HEDMAN (T) and MATTIASSON (B). An online sensor for monitoring of ethanol in beer. *J. Inst. Brew.* 90(2); 1984; 77-80

A modification of previously known online sensors for continuous measurement of ethanol and other volatile compounds using a gas sensitive semiconductor detector, in combination with gas permeable membranes, is presented. The online sensor is provided with a continuous dilution system which dilutes the ethanol samples to a degree necessary to obtain accurate signals from the detector in concentration ranges appearing in beer and other brewery products. The instrument delivers a continuous voltage of 0-10 V, proportional to ethanol concentrations of 0-20% (w/v) with an analysis time of 10-15 minutes. Disturbances from carbon dioxide and sugars in the medium are small and negligible. Other volatile compounds are only of influence when their concentrations are comparable to that of ethanol. AA

- 3667 SCHMITT (DJ), THOMPSON (LJ), MALEK (DM) and MUNROE (JH). An improved method for evaluating time-intensity data. *J. Food Sci.* 49(2); 1984; 539-42, 580

The Time-Intensity (TI) method was used to evaluate the perception of bitterness in beer. Testing methodology described in the literature was evaluated and modified as needed. A digitizer was used as an input device for transferring judges' TI curves to a computer. The computer utilized the digitized plots to estimate rates of increasing and decreasing bitterness based on curve fitting. Duration of bitterness, maximum intensity, and time to reach maximum intensity of different beers were also evaluated. Statistical analysis of the data was used to obtain reliable quantitative results from the TI curves. Different brands of beers were compared by this technique. A comparison of results obtained with TI and graphic scaling methods is also described. AA

- 3668 DELCOUR (JA), VANDENBERGHE (MM), DONDEYNE (P), SCHREVEVS (EL), WIJNHOFEN (J) and MOERMAN (E). Flavour and haze stability differences in unhopped and hopped all-malt Pilsner beers brewed with proanthocyanidin-free and with regular malt. *J. Inst. Brew.* 90(2); 1984; 67-72

Bitterness and astringency of hopped/unhopped beers brewed with regular malt and proanthocyanidin free malt were examined chemically and also tested by expert/untrained panels. The beers brewed with anthocyanidin free beers showed better colloidal stability than that brewed with regular malt. Unhopped, proanthocyanidin free beers also showed more of bitterness. In hopped beers, paired comparison tests did not reveal any bitterness, astringency and preference differences were not noticeable. No differences were found at 5% level between hopped/unhopped and regular malt/proanthocyanidin, beers while employing expert/untrained panel in triangular experiments. JVS

MALT

- 3669 AXCELL (B), JANKOVSKY (D) and MORRALL (P). Steeping - the crucial factor in determining malt quality. *Brew. Dig.* 58(8); 1983; 20-23

- 3670 MORGAN (AG), GILL (AA) and FREEMAN (RL). The relationship between some barley and green malt properties and malt hot water extract. *J. Inst. Brew.* 90(2); 1984; 105-8

Further studies have been made on the relationship between malt hot-water extract (HWE) and some barley and green malt characters previously

identified as influencing HWE. Relationships were found to be relatively consistent between spring and winter barleys and over years, suggesting that these characters play an important fundamental role in determining the HWE attainable under standard malting conditions. AA

WORT

- 3671 ARDAY-LEDEZMA (GJ) and SLAUGHTER (JC). The response of *Saccharomyces cerevisiae* to fermentation under carbon dioxide pressure. *J. Inst. Brew.* 90(2); 1984; 81-4

When laboratory fermenters containing 4 litres of wort were maintained under a variety of conditions at an excess pressure of 2 atmospheres of carbon dioxide throughout fermentation by *Saccharomyces cerevisiae* (NCYC 1108), the fermentation rate, yeast growth and final concentration of fusel oils all decreased and the final pH increased. This agrees with reported work on the effect of carbon dioxide pressure on fermentation by *S. carlsbergensis*. The effect of carbon dioxide pressure on the production and removal of vicinal diketones and their precursors by *S. carlsbergensis* is known to be variable but, except at very low temperatures, pressure has either no effect or increases the rate of removal of these compounds in the final stages of fermentation. In the present experiments with a strain of *C. cerevisiae*, however, carbon dioxide pressure always led to the fresh beer having a higher level of vicinal diketones and their precursors than the control fermentation, even at temperatures up to 20 C. AA

OILS AND FATS

- 3672 PARDUN (H). Critical remarks about residual benzene determination in extracted seeds. *Fette Seifen Anstrichm.* 85(10); 1983; 373-82 (German)

To lower the risk of explosion during upheaval or loading of extracted seeds, the precise knowledge of the residual benzene content in the seed is of high importance. To be able to judge the various new analytical methods, the relation between benzene content of the seed and of the surrounding air was studied in extended test series. It was found that both dimensions obey predominantly the law of Freundlich and that the benzene retention is scarcely influenced by kind and loose volume of the extracted seed, but strongly by its fat content. Basing on the results, the recent DGF standard method B-II 8a (83) for residual benzene determination in extracted seed (M. Arens and E. Kroll, *Fette Seifen Anstrichmittel* 85,307 (1983)) in which the total benzene content is deduced from the benzene concentration in the gas phase determined by gas chromatography, is estimated as very reliable. But the former DGF method, B-II 8 (68), too, applied for the same purpose, should be kept after some improvements have been carried out, because it demands only a small need of devices. AA

- 3673 ANON. Prediction of rancidity essential when extending shelf-life of processed foods. *Processed Prepared Food.* 153(2); 1983; 111-2

Discusses: genesis; test procedures to measure quality of oils; active oxygen method (AOM); storage testing; oxygen absorption tests; and rancidity prevention/control. BSN

- 3674 De MAN (JM) and De MAN (L). Automated AOM test for fat stability. *J. Am. Oil Chem. Soc.* 61(3); 1984; 534-6

A home-built version of the automated AOM test was used with Canola, corn, sunflower, olive and Crisco oils, shortening and lard. The endpoint was found by measuring the conductivity of a solution of the exit gas from the reaction tube. Coefficients of variability of the samples ranged from 1.1% to 8.3%. The endpoint of the test was about 100 PV for Canola oil, about 200 PV for corn oil and 35 PV for lard. The aqueous solutions of the volatiles of three oils were used to determine the TBA value. Canola, sunflower and olive oil had TBA values ranging from 6-60 μg malonaldehyde/g at the end point. No apparent relationship was found between the TBA values of the volatiles solutions and the PV's of the oils. AA

- 3675 HIRAYAMA (T), YAMADA (N), NOHARA (M) and FUKERI (S). The high performance of liquid chromatographic determination of total malondialdehyde in vegetable oil with dansyl hydrazine. *J. Sci. Food Agric.* 35(1); 1984; 338-44

Free MDA was reacted with dansyl hydrozine in acid medium and the product formed namely, 1-dansyl-pyrazole (DP.) was determined by HPLC. In order to release MDA from its precursor, ferric chloride of specific attributes was necessary. Satisfactory recoveries of free MDA and tetramethoxypropane (used as a MDA precursor) in vegetable oils were obtained. Only methyl linoleate was found to release MDA during autoxidation. The DP value correlated with TBA in the case of autoxidised methyl linolenate. JVS

GROUNDNUT OIL

- 3676 NASIRULLAH, RAJALAKSHMI (S), MALLIKA (T), KRISHNAMURTHY (MN), NAGARAJA (KV), and KAPUR (OP). Detection of rancid groundnut oil and its differentiation from castor oil: *Fette Seifen Anstrichm.* 85(10); 1983; 399-402

Detection of rancid groundnut oil and its differentiation from castor oil can be accomplished qualitatively by use of methanolic sulphuric acid decomposition and ferrous ions induced cleavage methods. Few chemical spray reagents have also been selected and applied for detection and differentiation purpose on thin layer chromatoplates. Among the reagents, ferrous thiocyanate, potassium iodide and starch, alkaline permanganate, combinations of hydroiodic, hydrochloric, acetic acids and starch and hydroiodic acid and starch, found working as brown, blue, and yellow coloured spots could be seen for rancid groundnut oil on thin layer chromatoplates. Fresh groundnut and castor oils not involved in all the estimations, suggesting a clear distinction between castor oil and rancid groundnut oil. AA

- 3677 NAZER (JMA) and YOUNG (CT). Effect of various pyrolysis parameters on the fragmentation patterns of peanut oil. *J. Food Sci.* 49(2); 1984; 662-4

A simple and rapid pyrolysis-gas liquid chromatographic technique to quantitate the fragmentation pattern of a commercial peanut oil was developed. The oil was pyrolyzed at 300, 500, 700, 900, and 1100 C for 4, 10, and 16 seconds. The optimum condition was determined by analyzing aliquots of the pyrolyzates by gas liquid chromatography and by quantitating data from 16 peaks. The operating parameters selected for optimum pyrolysis were 700 C for 10 seconds under N_2 gas and 360 mm Hg partial pressure. Preliminary tests showed that this condition could be extended to other fats and oils. AA

JOJOBA OIL

- 3678 HAMM (DJ). Preparation and evaluation of trialkoxytricarballylate, trialkoxycitrate, trialkoxyglycerylether, jojoba oil and sucrose polyester as low calories replacements of edible fats and oils. *J. Food Sci.* 49(2); 1984; 419-28

Trialkoxytricarballylate, trialkoxycitrate, trialkoxyglycerylether, sucrose polyester and refined jojoba oil were prepared and evaluated as low calorie replacements of conventional edible fats and oils. Their viscosities and surface and interfacial tensions were generally typical of edible oils, whereas their DSC behaviour was highly structure dependent. Incorporation of trialkoxytricarballylate and jojoba oils into margarine and jojoba oil into mayonnaise indicated that functional food models may be prepared from any of the tested oils. Trialkoxytricarballylate, trialkoxycitrate and jojoba oils were resistant to enzyme hydrolysis *in vitro*, suggesting resistance to digestion *in vivo*. Preliminary caloric value experiments in rats with trialkoxytricarballylate and jojoba oil supported *in vitro* findings. However, anal leakage, depression, weakness and deaths were observed among animals at moderate to high dose levels of both oils. AA

PRIMROSE OIL

- 3679 HUDSON (BJF). Evening primrose (*Oenothera* Spp.) oil and seed. *J. Am. Oil Chem. Soc.* 61(3); 1984; 540-43

SAFFLOWER OIL

- 3680 KORUS (RA) and MOUSETIS (TL). Polymerization of safflower and rapeseed oils. *J. Am. Oil Chem. Soc.* 61(3); 1984; 537-40

Rates of polymerization of oils from 2 safflower and 2 rapeseed varieties were measured in the air and under vacuum. Thermal polymerization rates showed stronger dependence on the degree of unsaturation than on oxidative polymerization. Molecular weight distributions of polymerized oils were determined by size exclusion chromatography, and the relationship between viscosity and weight-average molecular weight was determined. AA

SOYABEAN OIL

- 3681 BEAUREGARD (LG). Non-food uses of soyabean oil. *Chem. Ind.* 1; 1984; 18-21

The non food uses include; use of soyabean oil with pesticides, as a dust suppressant in grain elevators and for use as an alternative fuel for diesel engines or as an alternative chemical feedstock. BSN

- 3682 HILDEBRAND (DH), TERAQ (J) and KITO (M). Phospholipids plus tocopherols increase soyabean oil stability. *J. Am. Oil Chem. Soc.* 61(3); 1984; 552-5

Phospholipids (PL) and purified tocopherols (TOC) were added to unhydrogenated soybean oil; stability was determined in terms of the number of days taken for the experimental samples incubated at 100 C to develop peroxide value of 100 m.eq./kg. Addition of PL and TOC was found to increase oil stability. The effect of PL was not just concerned with the inactivation of prooxidant metals, but appeared to improve the efficacy of TOC in free radical termination. JVS

- 3683 WARNER (K) and MOUNTS (TL). Flavour and oxidative stability of hydrogenated and unhydrogenated soyabean oils. Efficacy of plastic packaging. *J. Am. Oil Chem. Soc.* 61(3); 1984; 548-51

Soyabean oils packed in polyvinyl chloride, clean glass, acrylonitrile and amber glass bottles and stability of their flavour were tested by trained sensory panels. The results have indicated that packaging of soyabean oils in polyvinyl chloride or acrylonitrile bottles is a viable alternative to packaging in clear bottles. AA

SUNFLOWER OIL

- 3684 ROBERTSON (JA) and BARTON (FE). Oil and water analysis of sunflower seed by near-infrared reflectance spectroscopy. *J. Am. Oil Chem. Soc.* 61(3); 1984; 543-7

The near infrared reflectance spectroscopy NIR was compared with wide line NMR for oil analysis and with A.O.C.S. over method for moisture. The NIR was calibrated with 120 samples for oil and 63 samples for moisture. The oil content determined by NIR and NMR were not different but significant differences were found in moisture content by the oven drying and NMR. JVS

MONOGLYCERIDE

- 3685 SZELAG (H) and ZWIERZYKOWSKI (W). The application of molecular distillation to obtain high concentrations of monoglycerides. *Fette Seifen Anstreichm.* 85(11); 1983; 443-6

Monoglycerides obtained by different methods were fractionated by means of molecular distillation. The temperatures that have to be reached in order to eliminate glycerol, fatty acids, and monoglycerides have been determined, as also the values of some other parameters at which highly concentrated monoglycerides may be obtained. The characteristic coefficients of monoglyceride distillates and distillation residues have also been determined. KMD

MARGARINE

- 3686 DENECKE (P). Margarine - its advantages and hints for appropriate application. *Ernährungsforschung.* 28(6); 1983; 177-179 (German)

The author has compared the composition and qualities of several brands of table and household margarine that are offered for sale on the markets of GDR, six Western European countries, and the U.S.A. The margarines have been classified as: (i) low-fat margarines; (ii) table, or delicatessen, margarines; and (iii) household margarines. KMD

SPICES AND CONDIMENTS

- 3687 THIMMAYAMMA (BVS), PARVATHI RAU and RADHAIAH (G). Use of spices and condiments in the dietaries of urban and rural families. *Indian J. Nutr. Dietet.* 20(5); 1983; 153-62

Information on the use of various types of spices and condiments was obtained from the dietaries of 153 families in urban and 93 families in

rural areas, during the family diet surveys through weighment method. Families with income more than Rs. 500/month were found to use more varieties of spices and condiments than those with income less than or equal to Rs. 500/month in the urban area or those in rural area. 55% of the rural families were observed to be mainly dependent on dry and or green chillies, tamarind, salt and turmeric, while another 17% also made use of garlic and ginger. The relationship between the intake of cereals and that of spices and condiments was observed to be positively correlated ($P = 0.001$). The contribution of nutrients (i.e. cal. protein, Ca, Fe, vitamin A, thiamine and riboflavin) from spices and condiments to the total intake of nutrients of these families from the dietaries ranged between 1.5% to 14.5%. Rural families were observed to derive more Ca and vitamin A from spices and condiments than those of the two income groups in the urban area. BSN

HORSERADISH

- 3688 WASSERMAN (BP), EIBERGER (LL) and GUILFOY (MP). Effect of hydrogen peroxide and phenolic compounds on horseradish peroxidase-catalyzed decolourization of betalain pigments. *J. Food Sci.* 49(2); 1984; 536-8, 557

SENSORY EVALUATION

- 3689 CICHY (RF). Sensory evaluation as a quality assurance tool in a commissary foodservice system. *Dairy Food Sanit.* 3(8); 1983; 288-92
Discusses: definition; sensory aspects of ground beef; ground beef patties - methods and analysis; and important QA/QC tools. BSN
- 3690 CONTRERAS (RJ), KOSTEN (T) and RANK (ME). Activity in salt taste fibers: Peripheral mechanism for mediating changes in salt intake. *Chem. Sense.* 8(3); 1984; 275-88

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

- 3691 PIMENTAL (D) and ANDOW (DA). Pest management and pesticide impacts. *Insect Sci. Applic.* 5(3); 1984; 141-9
Discusses: human pesticide poisoning; effects of pesticides on agro/ ecosystems; honey bees and pollination; crop losses and wild life effects. BSN
- 3692 BOTTRELL (DG). Government influence on pesticide use in developing countries. *Insect. Sci. Applic.* 5(3); 1984; 151-5
Discusses: status and trends; influence of government import and export policies, influence of developing country regulations; third world government pest control programmes; role of donor governments; and impact of government sponsored research and extension. BSN

- 3693 GUPTA (AA) and SENGUPTA (AK). Synthesis and fungicides properties of some 3-(substituted sulphamidophenyl) rhodanines and their benzylidene derivatives. *Indian J. Agric. Sci.* 53(5); 1983; 358-360

BIOCHEMISTRY AND NUTRITION

- 3694 ELMADFA (I), WESTHOFF (M) and HUHN (W). Development and evaluation of protein mixtures based on blood and collagen. *Nahrung.* 27(10); 1983; 917-27 (German)

Using aminoacid analysis data, protein mixtures were prepared using unconventional proteins (blood, collagen, wool) on the one hand and conventional proteins (soya, maize, casein) on the other. The quality of the protein mixtures was measured by growth experiments on rats (PER). The unconventional proteins were very poor in various essential aminoacids and hence were of low nutritive value; but their quality improved when they were mixed with other proteins of a better quality. The best improvement was achieved by mixtures of 4 or 5 different proteins, whose quality was measured as 94-100% as high as that of casein. Typical mixtures of this type contained 35% casein, 15% soya or maize, and 50% of blood or collagen or wool. KMD

- 3695 HUHN (W) and ELMADFA (I). Evaluation of the quality of protein mixture based on collagen and blood. A comparison of biological and chemical criteria for evaluations on rats. *Nahrung.* 27(10); 1983; 929-37 (German)

The quality of protein mixtures based on blood protein, collagen, wool and other proteins (e.g. casein, or soya) was evaluated using different biological and chemical criteria. The individual proteins were hydrolysed enzymatically before they were mixed. Protein quality (Biological Value or BV) was significantly affected by both acid and alkaline proteases. The BV of casein was greater than that of all the mixtures tested in these experiments. The results of growth experiments, as judged by various criteria such as PER, NPR and RNV (Relative Nutritive Value) did not correspond with each other, nor with the nitrogen-balance criteria such as BV or NPU. KMD

- 3696 MONTELLANO (MA), URBANO (G) and VARELA (G). Proteic-anabolic capacity in rats influence of the quality and quantity of dietary protein. *Nahrung.* 27(10); 1983; 909-16

- 3697 O'HARE (WT), CURRY (MC) and ALLEN (JC). Effect of buffering capacity on a commonly used assay of protein digestibility. *J. Food Sci.* 49(2); 1984; 498-9

A commonly used *in vitro* assay of protein digestibility depends upon the measurement of pH change as the protein is digested by a multi-enzyme preparation. This report presents evidence demonstrating that the buffering capacity of the protein under assay can have a major effect on the digestibility value assigned using this method. A modification of the assay using an automatic titrator has overcome this problem. AA

- 3698 SCHARF (U) and WEDER (JKP). Model studies on the heating of food proteins-influence of water contents on the amino acid composition of lysozyme and ribonuclease after heating. *Chem. Mikrobiol. Technol. Lebensm.* 8(3); 1983; 71-77 (German)

- 3699 CERNA (J) and KAS (J). New conception of folacin assay in starch of glycogen containing food samples. *Nahrung*. 27(10); 1983; 957-64
- 3700 FURUYA (EM), WARTHESEN (JJ) and LABUZA (TP). Effects of water activity, light intensity and physical structure of food on the kinetics of riboflavin photodegradation. *J. Food Sci.* 49(2); 1984; 525-8
- The kinetics of light-induced riboflavin degradation were evaluated in elbow macaroni, particulate macaroni, nonfat dried milk, skim milk and a buffered solution of riboflavin. A first order degradative mechanism was observed in liquid systems, while a two-phased mechanism was observed in dry food systems. Light intensities of 25, 50 or 100 ft-c showed no significant differences in effect on the rate of riboflavin loss in elbow macaroni; however, a very dim light showed only a single-phased first order rate of loss. In elbow macaroni exposed to a broad range of water activities the degradation of riboflavin increased at elevated relative humidities. Lumichrome was determined to have limited use as a quantitative indicator of riboflavin loss, but could be used as a qualitative indicator of riboflavin degradation. AA
- 3701 PLATT (SR) and CLYDESDALE (FM). Binding of iron by cellulose, lignin, sodium phytate and beta-glucan, alone and in combination, under simulated gastrointestinal pH conditions. *J. Food Sci.* 49(2); 1984; 531-5
- 3702 OLSON (OE) and PALMER (IS). Selenium in foods purchased or produced in South Dakota. *J. Food Sci.* 49(2); 1984; 446-52
- Selenium contents of 222 foods obtained in east-central South Dakota are presented, the best sources being foods of high protein content, such as: meats; South Dakota cheeses; semolina products; breads; breakfast cereals prepared from soybeans, hard wheat, or oats; poultry and eggs; and some seafoods. Average values from this study are generally lower than those reported for similar foods from Canada, higher than those reported from Washington, DC, and considerably higher than those reported from Ohio. A study of milk samples from eight processing plants over the state, gave an overall average and standard deviation of 61 ± 12 $\mu\text{g/L}$. Values were highest in December and lowest in May. AA
- 3703 SLORACH (S), GUSTAFSSON (I-B), JORHEM (L) and MATTSSON (P). Intake of lead, cadmium and certain other metals via a typical Swedish weekly diet. *Var Foda*. 35(9); 1983; 395-403, (Swedish)
- The dietary intakes of lead, cadmium, iron, zinc, copper and manganese were determined by analysing seven daily diets, prepared in 1980, together representing a typical weekly diet of an adult Swedish male. Analysis was performed by atomic absorption spectrophotometry. The weekly dietary intake of lead was found to be 0.2 mg, which is only 7% of the provisional tolerable weekly intake (PTWI) of 3 mg per person established by an FAO/WHO expert committee. The weekly dietary intake of cadmium found (circa 0.07 mg) is only about 16% of the PTWI proposed by the same committee (0.4-0.5 mg). The mean daily dietary intakes of zinc, copper, iron and manganese were found to be 8.6, 1.5, 14 and 2.6 mg, respectively. These figures were compared with those reported from other studies in Sweden, Finland, Denmark and the United Kingdom and with the intakes recommended for these trace elements in Sweden and the USA.
- 3704 RHODES (ME). Benefits of salt in food products. *Dairy Food Sanit.* 3(8); 1983; 293-6

- 3705 MAY (CD). Food sensitivity: Facts and fancies. *Nutr. Rev.* 42(3); 1984; 72-8

Discusses: current concepts based on immunologic mechanisms; emergence of confusion and controversy; and science in the field of food sensitivity. BSN

- 3706 HAENEL (H). Well nourished Children and Adolescents - Simple, practical rules for the sound nutrition of small children (1-3 years), preschool children (3-6 years), as also school children and adolescents (6-18 years) *Ernährungsforschung*. 28(6); 1983; 157-160 (German)

- 3707 KETZ (HA). Metabolism and nutrition under conditions of weightlessness. *Ernährungsforschung*. 28(6); 1983; 160-163 (German)

The calorie requirement of cosmonauts has been measured as 2000-2350 Kcal. in one case, and 2600-3200 kcal in another, depending on the type of space ship and space units used. Weightlessness causes increased transfer of Ca and P from the bone into the blood, with its accompanying effects on neuromuscular stimulation, and contraction of muscles. In combination with the increased excretion of fluid by the kidneys, this leads to a loss of minerals from the body. Despite the fact that the cosmonauts get a protein-rich diet, the N balance was negative. Further, the highly sterilized foods served in space ships disturb the intestinal microflora. KMD

- 3708 REUTER (W). Alcohol consumption and disturbances in fat metabolism. *Ernährungsforschung*. 28(6); 1983; 164-6 (German)

Regular consumption of alcohol leads to an increase in serum triglycerides and a high level of alcohol-induced hyperlipoproteinaemia (aHLP). The increase in HDL cholesterol, which accompanies an increase in alcohol consumption to some extent, is not a proof that alcohol has an anti arteriosclerotic action. The aHLP level must be viewed in the context of other factors (high blood pressure, hyperuricaemia, glucose intolerance, adiposity) and carries an atherogenic risk. The HLP level can be reduced best by total abstinence from alcohol, or at least by a very greatly reduced alcohol consumption. KMD

- 3709 MUNCH (S). Nutrition in developing countries - An assessment of bourgeois theories on the nutrition question in developing countries. *Ernährungsforschung*. 28(6); 1983; 169-173 (German)

The defects of bourgeois theories relating to nutrition in the developing countries have been pointed out, and a Marxist alternative has been suggested. KMD

- 3710 THOMAS (J) and PIETSCH (H-P). On the content of essential minerals in the mid-day meal of children's homes. *Ernährungsforschung*. 28(6); 1983; 175-177 (German)

Analysis of mid-day meals served for children's in homes has shown that the supply of Fe, Ca, P, N, K, and Cl is quite adequate. There is, however, a tendency to use too much of cooking salt (NaCl) which needs to be counteracted. For this purpose, routine estimations of Na and Cl should be carried out in the district health institutes. KMD

TOXICOLOGY AND HYGIENE

- 3711 UMANO (K), SHIBAMOTO (T), FERNANDO (SY) and WEI (CI). Mutagenicity of 2-hydroxyalkyl-N-nitrosothiazolidines. *Food Chem. Toxicol.* 22(4); 1984; 253-9

The mutagenicity of 2-hydroxyalkyl-N-nitrosothiazolidines was tested using *Salmonella typhimurium* strains TA98 and TA100. The N-nitrosothiazolidines tested were unsubstituted N-nitrosothiazolidine (NT), N-nitrosothiazolidine-4-carboxylic acid (NTC), 2-hydroxymethyl-N-nitrosothiazolidine (HMNT), 2-(1,2,3,4-tetrahydroxybutyl)-N-nitrosothiazolidine, 2-(1,2,3,4-tetrahydroxypentyl)-N-nitrosothiazolidine, 2-(1,2,3,4,5-pentahydroxypentyl)-N-nitrosothiazolidine (PHPNT) and 2-(1,2,3,4,5-pentahydroxypentyl)-N-nitrosothiazolidine-4-carboxylic acid. Among the N-nitrosothiazolidines tested only HMNT and PHPNT exhibited clear dose-response mutagenicity toward strain TA100 with or without metabolic activation. None of the 2-hydroxyalkyl-N-nitrosothiazolidines were mutagenic to strain TA98. NT exhibited much stronger mutagenicity than either HMNT or PHPNT. Mutagenic activities of TA98. NT exhibited much stronger mutagenicity than either HMNT or PHPNT. Mutagenic activities of NT and PHPNT were eliminated by carboxyl substitution in the position α to the N-nitroso group. AA

- 3712 WOGGON (H), KLEIN (S), JEHLE (D), ZYDEK (G) and KNOLL (R). Transformation reactions of special metals in organism and in the environment. Part I. Studies on the biotransformation of mercury compounds by soil and pure strains of fungi. *Nahrung.* 27(10); 1983; 983-93 (German)
- 3713 FRITZ (W). Analytics and evaluation of cancerogenic polycyclic aromatic hydrocarbons from the view of food hygiene and toxicology. A survey. *Nahrung.* 27(10); 1983; 965-73 (German)
- 3714 MES (J), DOYLE (JA), ADAMS (BR), DAVIES (DJ) and TURTON (D). Polychlorinated biphenyls and organochlorine pesticides in milk and blood of Canadian women during lactation. *Arch. Environ. Contam. Toxicol.* 13(2); 1984; 217-23
- 3715 HARAGUCHI (H), KUROKI (H), MASUDA (Y) and SHIGEMATSU (N). Determination of methylthio and methylsulphone polychlorinated biphenyls (PCB) in tissues - of patients with 'Yusho'. *Food Chem. Toxicol.* 22(4); 1984; 283-8
- The body tissues of 3 patients of PCB poisoning were analysed for methylthio and methylsulphone metabolites of PCB. The concentration of methylthio and methylsulphone metabolites of PCB in liver, lung and adipose tissues, were: 0.1-0.5 and 0.3-0.7; 0.2-0.4 and 1.0-2.50; and 0.5-1.0 and 0.7-1.0 mcg/kg respectively. KJVS
- 3716 ANON. Brominated oil residues and toxicity. *Food Chem. Toxicol.* 22(4); 1984; 319-26
- 3717 KAMINOGAWA (S), KUMAGAI (Y), YAMAUCHI (K), IWASAKI (E), MUKOYAMA (T) and BABA (M). Allergic skin reactivity and chemical properties of allergens in two grades of lactose. *J. Food Sci.* 49(2); 1984; 529-30, 535
- 3718 ANON. Recent knowledge on causative agents of microbial food-poisoning. *Gordian.* 83(10); 1983; 203-204

- 3719 DICKSON (JS) and MAXCY (RB). Effect of radiolytic products on bacteria in a food system. *J. Food Sci.* 49(2); 1984; 577-80
Inhibitory effects of radiolytic products were studied using *Escherichia coli*, *Pediococcus cerevisiae* and two radiation-resistant microorganisms, an isolate of *Moraxella-Acinetobacter* and a *Micrococcus* sp. End products of an irradiation dose of 300 Krads completely inhibited resistant organisms on an experimental medium with a very low concentration of nutrients. Plate count agar, with higher nutrient concentration, required 600 Krads to produce the same inhibition. On the same medium, radiation-sensitive organism could tolerate products generated by a 1000 Krad dose. However, no inhibition could be detected when either *Escherichia coli* or *Moraxella-Acinetobacter* was incubated at 5 C on the surface of fresh meat irradiated to 1500 Krad. The effects of inhibitory products in culture media could be mitigated by the addition of catalase or sodium pyruvate. AA
- 3720 ANOOP KUMAR and GUPTA (RS). Enterotoxigenic *Staphylococcus aureus* isolated from foods and human sources. *Indian Vet. J.* 60(8); 1983; 595-8
One thousand and twenty samples of milk, milk products, meat and human vomitus were examined for enterotoxigenic staphylococci. Of the 108 isolates of staphylococci made, 17 were coagulase positive. Serological identification of these 17 isolates for enterotoxigenicity further revealed, that 7 produced enterotoxin A, 3 enterotoxin D, 2 each E and BD and one each enterotoxin B, C and CD. AA
- 3721 COUSIN (MA), ZEIDLER (CS) and NELSON (PE). Chemical detection of mold in processed foods. *J. Food Sci.* 49(2); 1984; 439-45
Alternaria alternata, *A. solani*, *Colletotrichum coccodes*, *Fusarium oxysporum*, *Geotrichum candidum*, *Rhizopus stolonifer* and *Drosophila* flies were added to tomato and fruit purees and nectars at 0.1-10 mg (dry weight)/2 g sample, hydrolyzed at 121 C in potassium hydroxide (KOH) and analyzed colorimetrically for glucosamine. Glucosamine varied with product, quantity of mycelium, hydrolysis time, KOH concentration, age (older cultures gave highest value), and mold species (*R. stolonifer* gave maximum and *G. candidum*, minimum values). When processed foods spiked with molds were analyzed, the mold concentration was linearly correlated to glucosamine, but not to Howard mold count. *Drosophila* were barely detectable in hydrolyzed foods. Hydrolysis may be the critical step in this procedure. AA
- 3722 MAGIN (DF), COX (RH), EINOLF (WN) and CUTLER (HG). Mass spectrometry of cytochalasin H and its acetyl and deacetyl analogues. *J. Agric. Food Chem.* 32(3); 1984; 544-8
Cytochalasins are metabolites of moulds growing on cereal crops. Results of the electron ionisation and chemical ionisation mass spectra of cytochalasins have been reported in this study. The mass spectral examination of cytochalasin H series of compound was facilitated by using desorption chemical ionisation. JVS
- 3723 YOUSEF (AE) and MARTH (EH). Kinetics of growth and accumulation of aflatoxin B₁ by *Aspergillus parasiticus* in the presence of butylated hydroxyanisole, isoprothiolane, and nystatin. *Biotechnol. Bioeng.* 26(1); 1984; 6-11
- 3724 PASSI (S), NAZZARO-PORRO (M), FANELLI (C), FABBRI (AA) and FASELLA (P). Role of lipoperoxidation in aflatoxin production. *Appl. Microbiol. Biotechnol.* 19(3); 1984; 186-90
In vitro synthetic lipoperoxides greatly stimulate aflatoxin production

when added to cultures of toxigenic strains of *Aspergillus parasiticus*, *A. flavus*. *In vivo*, the amount of toxin formed in sunflower seeds of different ages inoculated with *A. parasiticus* is directly related to the peroxide number of their oil content, with higher the peroxide number, higher is the aflatoxin production. KAR

- 3725 KELLER (WE). Trichothecenes: Still mysterious mycotoxins. *Bioscience*. 34(1); 1984; 10-11

Discusses: toxicological effects; research approaches needed; protective measures; and environmental effects. BSN

- 3726 WILSON (T), RABIE (CJ), FINCHAM (JE), STEYN (PS) and SCHIPPER (MAA). Toxicity of rhizonin A, isolated from *Rhizopus microsporus*, in laboratory animals. *Food Chem. Toxicol.* 22(4); 1984; 275-81

The isolate of *R. microsporus* was clearly toxic and caused 100% mortality of inbred male rats (BD/X) when fed with 50% (w/w) maize culture material and rat feed. The rhizonin A produced by using the same culture was fed to young male rats by gavage in doses of 70 to 180 mg/kg. Liver/kidney lesions were alike in rats fed culture material and rhizonin A. Adverse changes in hepatocytes and renal tubular epithelium were noticeable due to the intubation with rhizonin A. JVS

I N D E X

- Additives of natural origin 3464
 Adenosine diphosphate in chicken muscle 3623
 Adenosine monophosphate in chicken muscle 3623
 Adenosine triphosphate
 in beef muscle 3598
 in chicken muscle 3623
 Adzuki bean starch 3505
 Aflatoxin
 in almond kernel 3526
 effect of lipid peroxidation 3724
 effect of propionic acid of maize 3500
 maize 3499
 meal
 effect of packaging 3502
 effect of storage 3502
 in milk and milk powder 3582
 production in the presence of BHA, isoprothiolane and nystatin 3723
 Agricultural waste, pectolytic enzyme production 3450
 Alcohol and fat metabolism 3708
 Alkylresorcinol, growth inhibition effect 3471
Allium grayi flavour compounds 3529
 Almond kernel, aflatoxin 3526
 Aluminium and polyethylene based helical cans 3443
 Aluminium in coffee brewed in aluminium percolator 3659
 Amino acid
 in irradiated kamaboko 3644
 in mackerel muscle 3638
 in maize 3496
 in raspberry juice 3652
 in ribonuclease effect of water 3698
 in shrimp effect of salinity 3645
 in strawberry juice 3652
 Amylase
 fungal, use in bread 3573
 synthesis 3459
 in wheat kernel 3583
 Amylopectin in barley 3494
 Anthocyanin in crowberry 3549
 Apple
 composition 3553
 market survey 3556
 pomace, energy and solids recovery 3555
 processing machine 3554
 Apple (contd.)
 sucrose esters migration 3550
 Apple juice
 biomass production 3657
 effect of preservatives 3657
 colour stability 3656
 patulin production
 by *Byssoschlamys nivea* 3657
 effect of preservatives 3657
 Aroma, roasted and ground coffee 3658
 Artichoke
 cynarin 3538
 drying 3539
 Aspartame reactivity with aldehyde 3468
Auxis tapeinosoma See mackerel

Bacillus subtilis
 hop and garlic oil inhibitory effect 3464
 meat 3600
 Bacon
 nitrosamine formation 3613
 nitrosothiazolidine formation 3612
 Bacteria
 count in food 3448
 effect of radiolytic products 3719
 Bacteriophage, effect on fermented sausage 3615
 Baked products, milk protein 3569
 Baking behaviour of wheat and rye meal
 Banana, sucrose esters migration 3550
 Barley
 amylopectin structure 3494
 gibberellic acid uptake 3493
 malting quality 3670
 pericarp and testa 3492
 Beef
 blood globin 3597
 muscle
 adenosine triphosphate 3598
 creatine phosphate degradation 3598
 creatine phosphokinase activity 3598
 stored, phospholipid changes 3599
 tallow, characteristics 3606
 Beer
 bitterness 3667
 chilled, cloudiness removal 3662
 ethanol determination 3666
 keeping quality 3663
 papain proteolytic activity inactivation 3664
 Benzene residues in extracted seed 3672

GENERAL

- 3727 HULSE (JH). Food resources and responsibility: A tale of two worlds. *J. Food Nutr.* 41(1); 1984; 2-9
- 3728 SLOAN (AE) and CURLEY-LEONE (L). Food products in the 1980s: The consumer in command. *Cereal Food World.* 29(6); 1984; 360-63
Discusses national/imitation goods; ethnic and regional foods; convenience foods; and changing at home eating. JVS
- 3729 URRUTIA (M). National agricultural policies and world hunger. *Food Nutr. Bull.* 6(1); 1984; 1-4
- 3730 KHARE (RS). Women's role in domestic food acquisition and food use in India: A case study of low-income urban households. *Food Nutr. Bull.* 6(1); 1984; 69-76
- 3731 SISLER (EC) and YANG (SF). Ethylene, the gaseous plant hormone. *Bioscience.* 34(4); 1984; 234-8
Discusses: effects of ethylene on growth; effect of ethylene on senescence; biosynthesis and its regulation; and mechanism of action of ethylene. BSN
- 3732 TIEMELER (D). An overview of genetic engineering. Elements of DNA cloning. *Cereal Food World.* 29(6); 1984; 349-52
Review of scope of genetic engineering, basic elements of the vector in recombinant DNA technology, illustration of a typical gene cloning experiment, procedures for preparing the molecule for cloning, enzymatic construction of heteroduplex encoding base changes and conversion of heteroduplex into novel gene. JVS
- 3733 KLEESE (RA). Prospects for genetic engineering in corn. *Cereal Food World.* 29(6); 1984; 357-9
- 3734 DOSHI (RR). Rural industries. Their potential and constraints. *Indian J. Agric. Econ.* 39(1); 1984; 24-6
- 3735 SINGH (RP) and WALKER (TS). Crop failure in the semi-arid tropics of Peninsular India: Implications for technological policy. *Indian J. Agric. Econ.* 39(1); 1984; 29-39
- 3736 PANDEY (UK), SARDANA (PK) and MANOCHA (V). An estimate of demand for and supply of cereals, coarse grains, pulses and oilseeds in Haryana. *Indian J. Agric. Econ.* 39(1); 1984; 84-99
- 3737 RANDHAWA (TS). The typology of innovations. *Invent. Intell.* 19(5); 1984; 217-9
- 3738 AMLA (BL). Abolish constraints on technological efficiency. *Indian Food Packer.* 38(3); 1984; 16-9
Aspects covered include, slow development; meaning of development; problem of obsolescence; choice of technology; careful monitoring; working women's needs; the risk factor; and taxation. BSN

FOOD PROCESSING AND PACKAGING

PROCESSING

- 3739 THAYER (DW). Food irradiation. *Cereal Food World*. 29(6); 1984; 353-6
Review. Discusses sources and uses of food irradiation; its application in meat, poultry and food disinfection; radurisation of fish; and radappertisation of nonrefrigerated sterilised diets. JVS

PACKAGING

- 3740 MAHADEVIAH (M). Development of indigenous tinplate and tin free steel for processed food. *Indian Food Packer*. 38(3); 1984; 34-42
Aspects covered include, indigenous hot dipped tinplate; indigenous electrolytic tinplate; physico-chemical characteristics of indigenous tinplate and the shelf-life of the products; assessment of differential tinplate; suitability of tin free steel; welded OTS can versus soldered can; CFTRI efforts for indigenous tinplate; base plate requirement; and tinplate production. BSN
- 3741 THAKUR (SK), BANERJEE (PK) and KUMARASWAMY (MC). Electrolytic tinplate and tin free steel industry in India. *Indian Food Packer*. 38(3); 1984; 43-50
Aspects covered include, demand and supply position; installed capacity, trend in industry; non metal container uses; energy consumption for cans; government policy, tin free steel, TCIL plant and process, product range and quality. BSN

FOOD ENGINEERING AND EQUIPMENT

- 3742 WASPI (P). Yield monitoring and recording unit. *Getreide Mehl Brot*. 38(3); 1984; 67-8 (German)
A technologically advanced apparatus manufactured by the firm Buhler Buhler Miag can calculate the yield and determine the quantity of through-flow in a flour mill. It also records these parameters automatically, and makes supervision of the mill operation considerably easier. The apparatus is simple to operate. BSN
- 3743 MOHRIG (W). Symposium: "Compressed air in milling industry". Technical and economic factors related to the use of compressed air equipment. *Getreide Mehl Brot*. 38(3); 1984; 90-93 (German)
Compressed air plays a decisive role in the automation of a flour mill. Energy consumption is the biggest cost factor. In addition, there are the maintenance costs, output capacity of the compressor, filtration, and drying. Energy can be saved by a suitable system of heat recovery. One must find the most economic solution for the production of compressed air, within the operational structure of the mill. KMD
- 3744 AHMED (SY), HARENDRANATH (R) and NARENDRA SINGH. A screw press for fractionating green vegetation. *J. Food Sci. Technol. (India)* 21(2); 1984; 97-9
The fractionation unit developed is a modification of the indigenous

oil crushing equipment. The single or two step processing equipment can process 100 kg of lucerne/hour and costs about Rs. 12,000 per unit. The press residue from two step processing has higher DM and less N than that from single step processing. The extract may be precipitated for gelling leaf protein concentrate. KAR

- 3745 SHARP (JR). The design and management of low temperature grain driers in England. A simulation study. *J. Agric Eng. Res.* 29(2); 1984; 123-31

A study of the effects of design, control and climate on the performance of low temperature grain drains was conducted using a computer simulation model of the drying of a deep bed of wheat. Energy consumption and the risk of spoilage were calculated by the model for sets of 20 years weather data. KAR

ENERGY IN FOOD PROCESSING

- 3746 KOCH (HJ). Experiences, problems, and trends of rational energy economy in the food industry of the GDR. *Ernährungsforschung.* 28(6); 1983; 166-8 (German)

- 3747 PIMENTEL (D), FRIED (C), OLSON (L), SCHMIDT (S), WAGNER-JOHNSON (K), WESTMAN (A), WHELAN (A), FOGLIA (J), POOLE (P), KLEIN (T), SOBIN (R) and BOCHNER (A). Environmental and social costs of biomass energy. *Bioscience.* 34(2); 1984; 89-94

FOOD CHEMISTRY AND ANALYSIS

- 3748 AGUERRE (RJ), SUAREZ (C) and VIOLLAZ (PE). Calculation of the variation of the heat of desorption with moisture content on the basis of the BET theory. *J. Food Technol.* 19(3); 1984; 325-31

Data of water desorption on different food products were analysed from the point of view of the BET theory. A plot of $\log C$ against $1/T$ as used for the independent evaluation of E_1-E_L and the pre-exponential a_1b_2/b_1a_2 in the expression for the constant C of the BET theory. It was found that a_1b_2/b_1a_2 may range from 10^{-3} to 10^{-6} and the E_1-E_L values are correspondingly much higher than usual. An equation has been obtained within the framework of the BET theory for the dependence of the net heat of desorption on moisture content. In the present analysis the variation of the monolayer value with temperature is considered by means of a simple empirical equation. The results are compared with the heats of desorption calculated directly by the Clausius-Clapeyron equation. AA

- 3749 MATHEIS (G) and WHITAKER (JR). Chemical phosphorylation of food proteins. An overview and a prospectus. *J. Agric. Food Chem.* 32(4); 1984; 699-705

Review of the various reagents used for phosphorylation of proteins to improve their functional properties such as water solubility, emulsification capacity, foaming and gel formation. Out of the several reagents used so far POCl_3 and sodium trimetaphosphate are believed to have the potential for large scale application. *In vivo* and *in vitro* studies showed that phosphorylation did not significantly affect the nutritional value of protein. JVS

- 3750 HATFULL (RS). The development and application of the Kjeldahl process for legislative purposes. *J. Assoc. Publ. Anal.* 21(4); 1983; 103-11
- 3751 BAGU (K) and RUTISHAUSER (IHE). Comparison of computerised nutrient analysis programs based on Australian, British and American tables of food composition. *J. Food Nutr.* 41(1); 1984; 17-20
- 3752 RAMACHANDRAN (M), ANJANA GROVER, BANERJEE (DB) and HUSSAIN (QZ). A simple method for determining protein content in foodstuffs using biuret colour reaction. *J. Food Sci. Technol. (India)* 21(2); 1984; 99-100
In this method, the sample is defatted, and the sediment is mixed with NaOH, centrifuged, and Gornall's modified biuret reagent was added to the supernatant, incubated and the violet colour is read at 555 nm. The values obtained by this simple method are in agreement with Kjeldahl values and could be adopted for determining the protein content of foodstuffs. KAR
- 3753 FABOYA (OOP). A note on the effect of calcium and magnesium in the estimation of the oxalic acid contents of foods. *J. Assoc. Publ. Anal.* 21(4); 1983; 141-4
Employing the ether extraction method used by Kyker *et al.* and the modified Clausen liquid/liquid extractor, total oxalate in standard solutions of oxalic acid in dilute hydrochloric acid was determined. A minimum necessary extraction time of 5 hours was established. Both calcium and magnesium ions were found to reduce the percentage oxalate extracted, the calcium being more drastic. A mixture of both ions in the same oxalate solution further reduced the amount of oxalate extracted. AA
- 3754 STEELE (RJ). Trace metal analysis of foods by Australian laboratories. *Food Technol. Aust.* 36(3); 1984; 135-40
Lead, cadmium, zinc, iron, tin and copper were determined in spiked and unspiked samples of apple puree by thirteen Australian laboratories. Atomic absorption spectrophotometry (AAS), used in the flame mode for the determination of zinc, iron and copper, proved to be an efficient and accurate method with low interlaboratory coefficients of variation and good recoveries of the spiked elements. In some instances, tin may have been lost in the ashing procedures as volatile stannic chloride or as insoluble meta-stannic acid. Lead was analysed by direct flame AAS, by solvent extraction followed by flame AAS and by electrothermal atomisation. This survey did not identify any of the methods as being inferior to the others. AA
- 3755 MUYS (T). Quantitative determination of lead and cadmium in foods by programmed dry ashing and atomic-absorption spectrophotometry with electrothermal atomisation. *Analyst.* 109(2); 1984; 119-21
Describes the simultaneous determination of lead and cadmium in foods by programmed dry ashing, in the presence of magnesium nitrate, complexing with sodium diethyldithiocarbamate, extraction with isobutyl methyl ketone and atomic-absorption spectrophotometry using the graphite furnace technique. Recoveries are 94-100% for lead and 94-109% for cadmium. AA
- 3756 AZNAREZ (J) and MIR (JM). Spectrophotometric determination of boron with curcumin after extraction with 2-methylpentane-2,4-diol-chloroform. *Analyst.* 109(2); 1984; 183-4
- 3757 BUSK (GC) Jr. Polymer-water interactions in gelation. *Food Technol.* 38(5); 1984; 59-60,62,64
The feature covers: components of gelation complex (in particular water

chemistry), water-solute interactions (hydrogen bonding, ionic bonding, hydrophobic association, van der Waal's forces), and polymer-water interactions. JVS

- 3758 DAVIS (EA) and GORDON (J). Microstructural analyses of gelling systems. *Food Technol.* 38(5); 1984; 99-102, 104-6, 109

FOOD LAWS AND REGULATIONS

Nil

FOOD MICROBIOLOGY

ETHANOL

- 3759 SILMAN (RW). Ethanol production by *Zymomonas mobilis* in fed-batch fermentations. *Biotechnol. Bioeng.* 26(3); 1984; 247-51

IDLI

- 3760 VENKATASUBBAIAH (P), DWARAKANATH (CT) and SREENIVASA MURTHY (V). Microbiological and physico-chemical changes in Idli batter during fermentation. *J. Food Sci. Technol. (India)* 21(2); 1984; 59-62

Split dehusked black gram (*Phaseolus mungo*) and rice were soaked in water, wet ground, and allowed to ferment in the environment without inoculation. In rice and black gram a drastic reduction of microbial load after washing and increase after soaking was noticed. Yeasts were absent in both; coliform build and increase in Lactobacilli were more in black gram after 7 hours of soaking. Batter samples were also collected separately from houses and hotels and analysed. The ground samples were analysed at 0, 6 and 18 hours of fermentation. Lactobacilli increased 6-7 log in all the samples; maximum being in laboratory samples, 3 log in domestic and decreased in hotel samples but were absent in laboratory and domestic samples. Swabs taken from grinding equipment of hotels showed 5 log level of yeasts. Decrease in pH during fermentation was observed in all the samples. Batter volume rise was maximum in hotel samples. GLC analysis of released gases showed CO₂ peaks in hotel sample and H₂ peak in domestic and laboratory samples. Yeasts isolated from fermenting batter include *Trichosporan pullulans*, *Torulopsis holmii* and *T. candida*. KAR

FERMENTED SOYABEAN PRODUCT

- 3761 KHADER (V). Nutritional studies on fermented, germinated and baked soya-bean (*Glycine max*) preparations. *J. Plant. Food.* 5(1); 1983; 31-7

The nutritional quality and protein efficiency ratio (PER) of *shoyu* a fermented soyabean product, fermented soya milk drink, germinated soyabean and germinated soyabean bread were studied. Nutritional quality was determined by chemical analysis of PER by animal feeding studies. Results indicate a slight change in the protein content of the processed products with no adverse changes in essential amino acid content. Ash content was greatest in germinated soyabeans. Trypsin inhibitor activity was markedly

reduced on germination. Animal feeding studies indicate a slight increase in protein quality on germination and fermentation. However, a slight decrease was noted in soyabean bread which may be due to the Maillard reaction rendering lysine unavailable. AA

- 3762 BEUCHAT (LR). Fermented soyabean foods. *Food Technol.* 38(6); 1984; 64-70

Summary of the processes for manufacturing *soy sauce*, *miso* and *tempeh* including the relevant flow-diagrams and production and consumption of these three products in USA. JVS

ENZYME

- 3763 THOMAS (AA), DROZD (TP) and WALTER (TJ). Amylase activities in fungal rennets and whey protein concentrate powder. *J. Agric. Food Chem.* 32(4); 1984; 825-8

Emphasis has been given in the present study for heat stability since it is most useful for removing the enzymatic activities in whey. Labelled ^{14}C -starch was used to for the detection of residual amylase activity in whey and food products. JVS

BACILLUS CALDOLYTICUS

- 3764 EMANUILOVA (EI) and TODA (K). α -amylase production in batch and continuous cultures by *Bacillus caldolyticus*. *Appl. Microbiol. Biotechnol.* 19(5); 1984; 301-5

The concentration and productivity of α -amylase increased remarkably, 15- and 11-fold respectively in a continuous culture of *B. caldolyticus* DSM 405 compared with batch culture provided starch was used as the sugar source in a casitone medium. KAR

ASPERGILLUS USTUS

- 3765 CUTLER (HG), CRUMLEY (FG), COX (RH), SPRINGER (JP), ARRENDALE (RF), COLE (RJ) and COLE (PD). Ophiobolins G and H: New fungal metabolites from a novel source, *Aspergillus ustus*. *J. Agric. Food Chem.* 32(4); 1984; 778-82

The isolation, identification, and biological activity of two new metabolites phiobolin G and ophiobolin H from *A. ustus* have been reported. JVS

FUSARIUM

- 3766 SUSAN BAHAR and JEANETT AZUAJE (T). Studies on the growth of *Fusarium* sp. on citrus waste for the production of single cell proteins. *J. Food Sci. Technol. (India)* 21(2); 1984; 63-7

Fusarium sp. was grown on the clear filtrate of organe peels (4% w/v) as substrate or after the addition of 0.15% (w/v) of ammonium sulphate and 0.2% (w/v) yeast extract as N and vitamin sources respectively. The final protein production of the mycelium in control cultures was 1.2 to 1.4 g/l or 0.20 g of protein per g of sugar consumed, while in the cultures supplemented with nutrients, the protein production was 23.7 to 4.6 g/l or 0.25 g of protein per g of sugar consumed. Protein production corresponded to almost 58% of the final biomass. The fungus growth rate (μ) was 0.56/hour in cultures supplemented with the additives and (0.42/h) in control cultures

respectively 90 and 70% of the sugar was consumed in the nutrient supplemented and in the control cultures respectively. Temperature of 27 C and pH of 4.6 were found to be optimum. The fermentation time was reduced to 5-6 hours when supplemented with the nutrients and a higher initial inoculum. The final biomass contained 26% carbohydrates, 55.8% proteins, 4.75% RNA, 0.76% DNA and 0.73% P. KAR

MUSHROOM

- 3767 KILARA (A), WITOWSKI (M), MCCORD (J), BEELMAN (R) and KUHN (G). Development of acidification processing technology to improve colour and reduce thermophilic spoilage of canned mushrooms. *J. Food Process. Preserv.* 8(1); 1984; 1-14

An acid vacuum hydration process followed by canning in EDTA/brine was evaluated for improving colour and reducing thermophilic spoilage of canned mushrooms. Blanching in citric, fumaric or phosphoric acids and vacuum hydration in 0.05M citric acid (pH 3.5) improved the colour of the canned product significantly over untreated controls. EDTA (500 ppm) in the canning brine further improved colour. Application of the citric acid vacuum hydration process to 227 kg quantities of fresh mushroom tissue in a commercial cannery resulted in no loss in canned product yield, significantly improved product colour, greatly minimized thermophilic spoilage and did not significantly influence flavour and texture. AA

YEAST

- 3768 TRIVEDI (NB), COOPER (EJ) and BRUINSMA (BL). Development and applications of quick-rising yeast. *Food Technol.* 38(6); 1984; 51,54-5, 57

Review. Discusses: protoplast fusion technique of developing new strains of yeast suited for activity in low and high sugar substrates; production of industrial quick rising yeast cells; fermentation protocols for dry yeast cultures; packaging of instant quick rising yeast; and applications of active dry yeast. JVS

- 3769 NAYINI (NR) and MARKAKIS (P). The phytase of yeast. *Food Sci.+ Technol.* 17(1); 1984; 24-6

Phytase was extracted from baker's yeast with 2% CaCl_2 and purified by ammonium sulphate fractionation and DEAE-cellulose chromatography. With phytate as substrate, the purified enzyme showed an optimum pH of 4.6, an optimum temperature of 45 C and $K_m = 0.21 \text{ mM}$. The enzyme activity increased by adding Fe^{++} and decreased in the presence of chelating agents. Yeast phytase displayed a broad substrate specificity. Inositol monophosphate was hydrolyzed by this enzyme much faster than the other inositol phosphates (di-, tri-, tetra-, penta-, and hexaphosphate). AA

- 3770 HACKING (AJ), TAYLOR (IWF) and HANAS (CM). Selection of yeast able to produce ethanol from glucose at 40 C. *Appl. Microbiol. Biotechnol.* 19(5); 1984; 361-3

8 strains of yeast with the highest yields at 40 C were evaluated in batch fermentation. Three of these, two *Saccharomyces* and one *Candida* were able to meet minimum commercial targets set at 8% ethanol from 14% (w/v) glucose at 40 C. KAR

- 3771 KYUNG (KH) and GERHARDT (P). Continuous production of ethanol by yeast "immobilized" in a membrane-contained fermentor. *Biotechnol. Bioeng.* 26(3); 1984; 252-6
- 3772 BEKER (MJ), BLUMBERGS (JE), VENTINA (EJ) and RAPOPORT (AI). Characteristics of cellular membranes at rehydration of dehydrated yeast *Saccharomyces cerevisiae*. *Appl. Microbiol. Biotechnol.* 19(5); 1984; 347-52
- Dehydration and subsequent rehydration of yeast cells causes a considerable increase of cytoplasmic membrane permeability. Addition of CaCl_2 , glucose and polyethyleneglycol to the rehydration medium caused a decrease in cell permeability assessed as the losses of potassium ions, nucleotides, as well as the total losses of intracellular compounds. KAR

FOOD ADDITIVES

- 3773 ORSI (F), ABRAHAM-SZABO (A) and LASZTITY (R). Examination of the composition and efficiency of certain surface-active additives (CPL and CSL preparations) used in the baking industry. *Acta Aliment.* 13(1); 1984; 23-38

The efficiency of ten CPL and CSL preparations used in the Hungarian baking industry was determined fundamentally by their fatty acyl lactic acid derivatives. An excessive amount of free fatty acids or fatty acyl polylactic derivatives reduces the efficiency. The following suggestions have been made: (a) the quantity of free lactic acid should not exceed 5-8%; (b) the quantity of free fatty acid should not exceed that of fatty acyl lactic acid; (c) the product should contain 30-60 mol% of at least two (16 and 18 C-atom) saturated fatty acids; and (d) the chloride content should not exceed 10-12 mg/g of product. KMD

ANTIOXIDANTS

- 3774 BUCK (DF). Food antioxidants - applications and uses in snack foods. *Cereal Food World.* 29(6); 1984; 301-3

Review. Discusses antioxidant treated roasting or cooking oils and salt, foodgrade antioxidant solutions, antioxidant treated packaging; and application of antioxidants in confectioneries, bakery snack foods, fried snack foods. JVS

SWEETENERS

- 3775 ANON. Malbit the bulk sweetener. Unique in its properties. *Confect. Prod.* 50(8); 1984; 466-7

CEREALS

RICE

- 3776 AGUERRE (RJ), SUAREZ (C) and VIOLLAZ (PE). Analysis of the interface conditions during drying of rice. *J. Food Technol.* 19(3); 1984; 315-23
- The influence of the relative air humidity on the surface conditions

of rice grain during drying was investigated. It was found that the equilibrium condition given by the desorption isotherm of the product is not valid over the whole range of relative humidity analysed. While this condition was verified with air of high relative humidity (between 43 and 59% for drying temperatures ranging from 40 to 70 C), the experimental results indicated that the surface moisture approaches the monolayer value given by the Brunauer, Emmett and Teller (BET) desorption isotherm when drying takes place with air of low relative humidity (7 and 14% for the same temperature range). An explanation of these facts is suggested taking into account the high value of the heat of desorption associated with the monolayer moisture content of the product under investigation. Finally, a method based on the Fick's second law solution when the time of drying becomes large enough is proposed to evaluate the surface moisture content of the grain independently of the conditions of the air drying. AA

WHEAT

- 3777 POMERANZ (Y) and AFEWORK (S). The effects of kernel size in plump and shrunken kernels, and of sprouting, on kernel hardness in wheat. *J. Cereal Sci.* 2(2); 1984; 119-26

Three methods (time to grind, particle size of ground wheat, and near-infrared reflectance, NIR of ground wheat) were used to measure hardness in samples of plump and of shrunken wheat, and in their sieved fractions, in two series of commercial wheat samples that varied in percentage of sprouted kernels, and in samples of four wheat cultivars germinated for various times in the laboratory. Hardness characteristics were much more affected by kernel size with shrunken kernels than with plump kernels. Generally, as kernel size decreased, grinding time and particle size of ground wheat increased and NIR reflectance values decreased. The percentage of sprouted kernels did not affect consistently the hardness values of commercial samples even though the results of hardness measurements by the three methods were correlated. Hard wheats (spring and winter) mellowed as germination proceeded; time to grind increased and particle size of ground wheat decreased. No such changes were observed with soft wheats. AA

- 3778 KUMAR (R) and SINGH (R). Levels of free sugars, intermediate metabolites, and enzymes of sucrose-starch conversion in developing wheat grains. *J. Agric. Food Chem.* 32(4); 1984; 806-8

Activities of all enzymes except invertase implicated in the synthesis of starch, in the wheat grain (*T. aestivum*) increased upto 35 days after anthesis but declined subsequently. Starch synthetase was slightly more active with ADPG than with UDPG. The free sugars reached peak level 14 days after anthesis. The major factor stopping starch synthesis appeared to be desiccation with grain maturation. JVS

- 3779 HOOK (SCW), BONE (GT) and FEARN (T). The conditioning of wheat. Moisture migration between the components of a mixed grist, and its effect on milling performance. *J. Sci. Food Agric.* 35(5); 1984; 584-90

Canadian and UK wheats have been conditioned to different moisture levels then blended and held for varying periods before milling. A progressive and substantial moisture migration between the components of the blend was observed, but the extent of such migration had negligible effect on milling performance. KAR

- 3780 HOOK (SCW), BONE (GT) and FEARN (T). The conditioning of wheat. A comparison of UK wheats milled at natural moisture content and after drying and conditioning to the same moisture content. *J. Sci. Food Agric.* 35(5); 1984; 591-6

Four UK wheat varieties were milled at natural (as received) moisture content (range 15-15.5%) and after drying, storing and conditioning back to the original 'as received' level. The milling performance of the wheats was assessed in terms of extraction rate, flour colour and flour moisture content. Wheats that had been conditioned gave higher extraction rates, lower grade colour figures and lower flour moisture contents when compared with the same wheats milled at natural moisture content. AA

- 3781 BHATTACHARJEE (M) and Bhole (NG). The keeping quality of wheat flour in different packaging materials. *Food Nutr. Bull.* 6(1); 1984; 81-3

- 3782 DENGATE (H) and MEREDITH (P). Variation in size distribution of starch granules from wheat grain. *J. Cereal Sci.* 2(2); 1984; 83-90

The starch granule weight (SGW) distribution in different cultivars of bread wheat had been studied. SGW mainly depended on the cultivar although the place of cultivation also exerted some effect. During drought, the proportion of granules with a diameter of more than 20 μ m appeared to reduce. JVS

- 3783 BJORCK (I), ASP (N-G), BIRKHED (D) and LUNDQUIST (I). Effects of processing on availability of starch for digestion *in vitro* and *in vivo*: I. Extrusion cooking of wheat flours and starch. *J. Cereal Sci.* 2(2); 1984; 91-103

Extrusion cooking of starch was found to make it more susceptible to alpha amylase than boiling. The lowering of pH in the dental plaque was more evident in extruded materials. The rate of starch absorption noticed *in vivo* experiments was same for boiled samples as well as mildly extruded materials. JVS

- 3784 GRAVELAND (A), BOSVELD (P), LICHTENDONK (WJ) and MOONEN (JHE). Isolation and characterisation of (3-methoxy-4-hydroxyphenyl)- β -cellotriside from wheat flour. A substance involved in the reduction of disulphide-linked glutenin aggregates. *J. Cereal Sci.* 2(2); 1984; 65-72

A compound present in the propan-2-ol/water extract of wheat flour was found to convert the sodium dodecyl sulphate (SDS)-insoluble glutenin fraction into SDS-soluble glutenin fraction during the dough mixing stage. It was purified by chromatography and HPLC, it was found to contain 1 molecule of 3-methoxyhydroquinone and 3 molecules of glucose. The characterisation of this compound was done by employing IR spectroscopy, proton magnetic resonance spectroscopy, MS and degradation by acid hydrolysis. JVS

- 3785 PAYNE (PI), JACKSON (EA) and HOLT (LM). The association between- γ -gliadin 45 and gluten strength in durum wheat varieties: A direct casual effect or the result of genetic linkage? *J. Cereal Sci.* 2(2); 1984; 73-81

Wheat varieties were subjected to two different two dimensional electrophoresis techniques. Three of them contained gamma gliadin (band 45), ω -gliadin and the same units of low molecular weight glutenin LMW 2. These three varieties were found good for pasta production. Three other wheats which showed poor pasta cooking quality, contained γ -gliadin 42, ω -gliadins 33, 35 and 38 and low molecular weight glutenin sub-unit LMW-1. JVS

- 3786 DAVIS (KR), PETERS (LJ) and LE TOURNEAU (D). Variability of the vitamin content in wheat. *Cereal Food World*. 29(6); 1984; 364-9

Discusses, effect of different biotic factors on niacin, thiamine, riboflavin, pyridoxine complex, pantothenic acid, folic and tocopherol contents of wheat. JVS

- 3787 PAL SINGH (R) and BAINS (GS). Study of proteolytic inhibitor in Indian wheats and response to proteolytic supplements. *J. Food Sci. Technol. (India)* 21(2); 1984; 71-5

Indian bread wheat variety WG 357 and S 308 and their milled fractions (bran, shorts and flour) were tested for proteolytic inhibitor activity using papain, ficin and Rhozyme A at 60-300 casein units (CU)/100 g. Statistically significant differences existed in the protease inhibitory effect of the varieties their milled fractions and the proteolytic supplements. Inhibition of ficin activity was less than that of papain and Rhozyme -A. Ficin affected the gluten strength of both the varieties than papain which affected more the S 308 gluten at 30-120 CU/100 g range. Rhozyme-A had little affect on the gluten on both the varieties. At 10-40 CU/100 g levels and with increased reaction time, papain was more damaging to gluten. WG 357 withstood proteolytic action better than S 308. Ficin treated doughs were found normal to handling during baking. Papain was deleterious to loaf quality whereas ficin and Rhozyme A-4 improved crumb grain and texture. Evidence is presented to show that soluble N values as an index of proteolytic inhibition is inadequate to reflect mechanics of action in relation to dough and gluten. KAR

- 3788 SAMBASIVA REDDY (A). Protein content of wheat as influenced by irrigation frequencies, levels of nitrogen and phosphorus. *Andhra Agric. J.* 30(4); 1983; 277-8

In field experiments conducted, it was found that differences in protein content due to irrigation frequencies and levels were not significant. However, application of 120 kg N/ha and 25 and 50 kg P₂O₅/ha gave significantly superior amounts of protein in the grain. Wheat crop was provided with (i) one, (ii) two and (iii) adequate irrigation with N and P levels of 0, 40, 80, and 120 kg/ha and P₂O₅ at 0, 25 and 50 kg/ha respectively. The protein content of wheat did not show significant difference due to irrigation frequencies and levels of N and P. MVG

- 3789 OSBORNE (BG) and WILLIS (KH). Studies into the occurrence of some trichothecene mycotoxins in UK home-grown wheat and in imported wheat. *J. Sci. Food Agric.* 35(5); 1984; 579-83

- 3790 HOOK (SCW), BONE (GT) and FEARN (T). The influence of air temperature and relative humidity on milling performance and flour properties. *J. Sci. Food Agric.* 35(5); 1984; 597-600

Three wheats, one Canadian and two from the UK, were used to investigate the effect of ambient temperature and relative humidity (r.h.) on milling performance and flour properties. When the temperature was varied from 25 to 15 C, a decrease in ambient temperature was accompanied by an increase in extraction rate but no change in flour moisture content. When the r.h. was varied from 70 to 50%, a decrease in r.h. was accompanied by an increase in extraction rate and a decrease in flour moisture content. Changes in r.h. had a greater influence on milling performance and flour properties than did changes in ambient temperature. AA

- 3791 PALLAGI-BANKFALVI (E). Protein subunit distribution in wheat flours and their relation to baking quality. *Acta Aliment.* 13(1); 1984; 3-11

The protein composition of the following wheat cultivars was studied. Yubilemaya 50, GKF-2, Rana 1, Sava and Partizanka. The molecular mass distribution studies have shown that in high quality flour, the proportion of high and medium molecular mass gluten proteins to low molecular mass components ($< 50,000$) approximates 1:1. The overweight of low molecular mass gluten components results in a poorer bread making and gluten quality. In the formation of the baking quality, the quality and quantity of the high molecular mass gluten fractions play a decisive role. AA

- 3792 LEELAVATHI (K), HARIDAS RAO (P), INDRANI (D) and SHURPALEKAR (SR). Physico-chemical changes in whole wheat flour (Atta) and resultant atta during storage. *J. Food Sci. Technol. (India)* 21(2); 1984; 68-71

Atta (whole wheat flour) with 7.7% moisture and resultant atta with 12% moisture were stored for 5 months in air tight tin containers at 27-29 C and 60-70% RH and samples were withdrawn periodically to determine the free fatty acids (FFA), alcoholic acidity (AA) and organoleptic quality. FFA and AA increased rapidly during storage and was 0.19 and 0.30% respectively in resultant atta and 0.05 and 0.15% respectively in atta at the end of storage. Musty and bitter taste developed in atta at the end of 3 months and in resultant atta at the end of one month. Dough development time and dough stability were not affected due to storage in atta, while in resultant atta a considerable increase in the above characteristics were observed. The adverse changes during storage of resultant atta were minimised by reducing its moisture from 12.1% to 7.8%. KAR

MILLETS

PEARL MILLET

- 3793 ABDELRAHMAN (A), HOSENEY (RC) and VARRIANO-MARSTON (E). The proportions and chemical compositions of hand-dissected anatomical parts of pearl millet. *J. Cereal Sci.* 2(2); 1984; 127-33

A simple procedure was developed and used to dissect pearl millet (*Pennisetum americanum*) kernels. Medium sized grains contained: endosperm 75.1%; germ 17.4%; and bran 7.5% (pericarp+ aleurone). The germ in this millet represented a greater proportion of the grain than other millets. JVS

- 3794 VAKHARIA (DN) and CHAKRABORTY (MK). Note on lipid composition of hybrid pearl millet varieties. *J. Food Sci. Technol. (India)* 21(2); 1984; 105-7

Total lipids, polar and non-polar lipids and their components were determined in 5 hybrid varieties. (CJ-104, BJ-104, GHB 1399, GHB 18, and GHB 27) and one local variety (S 207) of pearl millet (*Pennisetum typhoides*). Lipid content in the variety ranged from 56.5 to 66.5 mg/g. The range of variation in polar lipids was 11.7-20.0 and non-polar lipids 43.0-54.5 mg/g. The ratio of non-polar to polar lipids in the hybrid varieties ranged from 1.8 to 4.6 whereas in local variety it was 3.2. Glycolipids were the major polar lipids and triglycerides and free fatty acids were the main non-polar lipids. GHB 27 was more close to local variety than other varieties. KAR

POPCORN

- 3795 PAL SINGH, SAXENA (AK) and SEHGAL (KL). Popping quality of half-sib families of popcorn. *J. Food Sci. Technol* (India) 21(2), 1984; 104-5

73 half-sib families from Ludhiana popcorn variety were evaluated based on popping percentage (PP), popped volume (PV) and popping index (PI). No significant correlation of either popping percentage or the popped volume could be established with grain weight or volume. PI which is the ratio of popped and unpopped bulk volume serves a better index than PP or PV. HS 23, HS 72 and HS 81 excelled others in PI, PV and PP respectively. KAR

PULSES

- 3796 JADHAV (KB) and JADHAV (LD). Use of some vegetable oils, plant extracts and synthetic products as protectants from pulse beetle, *Callosobruchus maculatus* Fabr. in stored gram. *J. Food Sci. Technol.* (India) 21(2); 1984; 110-13

Ten products including bit (benzyl isothiocyanate), allitin (diallyl disulphide), ratanjyothi (*Jatropha curcas* L.) oil, neem (*Azadirachta indica* J.), undi (*Callophyllum inphyllum*) oil, Mahwa (*Basia latifolia*) oil, Dodonaea (*Dodonaea viscosa* L.) extract, nirgundi (*Vitex negunda*) extract, coconut (*Cocos nucifera*) shell extract and clove oil at 0.1-0.3% (v/w) concentration were tested against the growth and development of *C. maculatus* including % mortality of beetles, number of eggs laid, and eggs hatched and average % of adults emerged. 33 days after treatment, it was found that Ratanjyothioil at all the levels, neem oil at 0.2 and 0.3% and bit as well as undi at 0.3% concentration significantly inhibited the emergence of adult beetles and there was 100% mortality of eggs. The germination capacity of the seed was not affected. KAR

PEA

- 3797 WRIGHT (DJ), BUMSTEAD (MR), COXON (DT), ELLIS (HS), DUPONT (MS) and CHAN (HWS). Air classification of pea flour. Analytical studies. *J. Sci. Food Agric.* 35(5); 1984; 531-42

Pea-milling and subsequent air classification of whole peas was investigated on laboratory scale equipment. Particle size distribution and composition of air classified fractions obtained under different operating conditions have been determined. KAR

CHICK PEA

- 3798 ROSSI (M), GERMONDARI (I) and CASINI (P). Comparison of chickpea cultivars: chemical composition, nutritional evaluation, and oligosaccharide content. *J. Agric. Food Chem.* 32(4); 1984; 811-4

Gas formation resulting from legume consumption is common due to the fermentation of undigested matter by intestinal microflora. Alpha-galactosides are particularly untreated because of the absence of alpha-galactosidase in the mammalian system. During the present screening programme, black seeded cultivars of chickpea showed the highest fibre content, lowest N-free extracts and double the alpha-galactosides as compared to yellow

seeded cultivars. Methionine and cystine were first limiting acids in black as well as yellow seed. *In vitro* digestibilities of black and yellow seeds were 78% and 75% respectively. JVS

- 3799 SAINI (HS) and KNIGHTS (EJ). Chemical constitution of starch and oligosaccharide components of "Desi" and "Kabuli" chickpea (*Cicer arietinum*) seed types. *J. Agric. Food Chem.* 32(4); 1984; 940-44

Acid detergent fibre and seed coat weight were higher in *Desi* than *Kabuli* type chickpeas. The protein contents of both were similar. Raffinose type oligosaccharides were higher in *Kabuli* than in *Desi* chickpea. Stachyose in *Desi* type and sucrose in *Kabuli* type were the main sugars. Verbascose ranged from 0.09-0.41 g/100 g seeds. JVS

COW PEA

- 3800 OLOGHOBO (AD) and FETUGA (BL). The effect of processing on the trypsin inhibitor, hemagglutinin, tannic acid and phytic acid contents of seeds of ten cowpea varieties. *J. Food Process. Preserv.* 8(1); 1984; 31-9

Trypsin inhibitor (TI) and hemagglutinin activities, tannic acid and phytic acid contents were determined in ten varieties of cowpea. The different varieties were subjected to four processes: cooking, soaking, autoclaving and germination. TI and hemagglutinin activities were completely eliminated by cooking and autoclaving, while tannic acid and phytic acid contents were only partly affected. Cooking reduced tannic acid contents by 31.0-47.3%. Soaking for three days decreased TI activity by a mean of 31.2% hemagglutinin activity by 19.0%, tannic acid by 13.4% and phytic acid by 24.4%. Maximum germination effects on TI and hemagglutinin activities were obtained in 'Westbreed' and 'Kano 1696', where percentage losses amounted to 57.2 and 57.6, respectively. The phytic acid contents of all varieties were greatly reduced by germination. AA

MUNG BEAN

- 3801 MALHOTRA (OP) and ASHOK KUMAR. Partial purification and effect of adenine nucleotides on the activities of phosphoglycerate kinase of germinating mung beans (*Phaseolus aureus*). *Curr. Sci.* 53(4); 1984; 732-4

The phosphoglycerate kinase activity was maximum after 36 hours of germination in mung bean and decreased sharply thereafter. The enzyme activity assay of partially purified enzyme showed 3-phosphoglycerate, ATP, NADH, glyceraldehyde 3-phosphate dehydrogenase (excess) and phosphoglycerate kinase (rate limiting). There was an initial lag period of 20 seconds at 10 mM ATP during which NADH disappeared at a gradually increasing rate before reaching a steady state. At lower ATP Upto concentration of 5 mM), no lag period was observed; lag period did not also exist if ADP (1-100 μ M) was present in assay solution. MVG

WINGED BEAN

- 3802 TAN (N-H), WONG (K-C) and De LUMEN (BO). Relationship of tannin levels and trypsin inhibitor activity with the *in vitro* protein digestibilities of raw and heat-treated winged bean (*Psophocarpus tetragonolobus*). *J. Agric. Food Chem.* 32(4); 1984; 819-22

The *in vitro* protein digestibility of *P. tetragonolobus* seeds was 68.8 to 72.9%. It was increased 76-90.7% by heat treatment which also reduced trypsin inhibitor activity and tannin content. JVS

OILSEEDS AND NUTS

- 3803 MANDAL (B). Oilseeds in West Bengal. *J. Oil Technol. Assoc. India* 16(1); 1984; 15-17

The author has discussed the possibilities of increasing the production of some oilseeds grown in West Bengal, viz: rapeseed and mustard, sesame, linseed, groundnut, sunflower, safflower, and niger seeds. The cultivated area, production and yield of various oilseeds have been reported for the period 1976-1982. KMD

- 3804 EGGERS (R) and STEIN (W). High pressure extraction of oilseeds. *Fette. Seifen Anstrichm.* 86(1); 1984; 10-16 (German)

Results of pilot plant trials on the direct oil extraction from rapeseed and oil extraction from rapeseed oil-cake by means of super-critical CO₂ have been reported. The quality of the oil so obtained is better than that of an oil extracted by hexane. The process is approximately as costly as the traditional solvent extraction process; if one uses CO₂ at a pressure of 750 bar.

CONOPHOR

- 3805 IGE (MM), OGUNSUA (AO) and OKE (OL). Functional properties of the proteins of some Nigerian oilseeds: Conophor seeds and three varieties of melon seeds. *J. Agric. Food Chem.* 32(4); 1984; 822-5

The three different materials, namely, *Cucumeropsis edulis*, *Citrullus vulgaris* and *Tetracarpidium conophorum* showed protein contents of 38%, 30.8-34.1% and 23% respectively. They had a fat content of 43-51%. Their functional properties namely water soluble nitrogen, fat absorption capacity, emulsion capacity and water holding capacity were comparable to soy proteins. The flour protein showed minimal solubilities at two different pH but protein isolates showed single isoelectric points. The proteins of *T. conophorum* were highly soluble at low pH showing the potential for use in beverages. The other two materials showed potential as human food because of good functional properties. JVS

COTTONSEED

- 3806 YANNAI (S) and BENSAL (D). Gossypol in cottonseed products: Toxicology and inactivation. *Arch. Toxicol. Suppl.* 6; 1983; 167-74

The study has revealed that by cooking cottonseed meals with added phospholipids, most of the gossypol gets detoxified without impairing the relative high available lysine and chemical index of the resulting cottonseed meal. BSN

PALM

- 3807 DRAETTA (IS) and BEN-SHALOM (N). Interference of carbohydrates during purification of peroxidase from palm (*Euterpe edulis* Mart.). *J. Food Biochem.* 8(2); 1984; 109-21

SOYABEAN

- 3808 ANON. Soya uses in human food. *Br. Food J.* 86(920); 1984; 82-3
Discusses: consumer acceptance; natural food lobby; uses; preparation; and growing substitution of meat. BSN
- 3809 KANANI (MK), ZUILICHEM (DJVan), ROOZEN (JP) and PILNIK (W). A modified procedure for low temperature infrared radiation of soyabeans. *Food Sci.+Tech. nol.* 17(1); 1984; 39-41
The effects on oil quality and yield of infrared heat treatment of whole soyabeans prior to oil extraction was investigated. Peroxide value, off-flavours, and percent free fatty acids of the oils from pretreated beans were considerably lower than that from raw beans. At the same time, the crude, water-degummed oil after bleaching had a sufficiently low phospholipid level to meet the refiners' specification for deodorization. This procedure may be employed to circumvent alkali refining and also produce extracted flakes free from urease activity and so suitable for direct utilization as feed. Oil yield was reduced slightly. AA
- 3810 MURPHY (PA) and RESURRECCION (AP). Varietal and environmental differences in soyabean glycinin and β -conglycinin content. *J. Agric. Food Chem.* 32(4); 1984; 911-5
- 3811 HILDEBRAND (DF) and KITO (M). Role of lipoxygenases in soyabean seed protein quality. *J. Agric. Food Chem.* 32(4); 1984; 815-9
The objectionable flavour of soy milk is due to the carbonyl compounds bound to protein; the first step in the formation of carbonyl compounds is the lipid oxidation catalysed by lipoxygenases. Soyabean is known to contain 3 lipoxygenase isoenzymes, namely, lipoxygenase 1(L-I), lipoxygenase 2(L-II) and lipoxygenase 3(L-III). The experimental evidence generated in this study shows that the L-I-deficient mutants of soyabeans can reduce the level of volatile carbonyl compounds and TBA-reacting substances with minimal heating and loss of protein. JVS
- 3812 RIZK (SW) and CLYDESDALE (FM). The effects of ascorbic acid, pH, and exogenous iron on the chemical iron profile of a soy protein concentrate. *J. Food Biochem.* 8(2); 1984; 91-102
Graded levels of ascorbic acid ASC were added to a soy protein concentrate slurry (SC) to produce various pH levels. In order to separate the effect of ASC on pH versus reduction and/or chelation, controls were included which contained appropriate amounts of concentrated HCl to match the acidity of the corresponding ASC samples. In addition, iron was added with and without Asc. Addition of 10-50 mM Asc produced statistically significant increases in percent soluble and ferrous iron over the corresponding acid controls. Results suggest that the ability of Asc to decrease the iron binding capacity of soy protein was predominantly a function of its reducing capabilities, rather than its effect on pH and/or chelation. Also, it was noted that excessive amounts of iron added to the SC produced significant differences in chemical iron profile as compared to the control. This suggests that

care must be taken in assuming the presence of a common pool of non-heme iron when both exogenous and endogenous iron are present. AA

- 3813 CHARPENTIER (BA) and LEMMEL (DE). A rapid automated procedure for the determination of trypsin inhibitor activity in soy products and common food-stuffs. *J. Agric. Food Chem.* 32(4); 1984; 908-11

The method is based on an improved procedure using the synthetic substrate benzoylarginine-p-nitroanilide. It is quick and offers the advantages of reproducibility and applicability to several foods such as eggs, cheese, beef, vegetables and soy products. JVS

- 3814 NITSAN (Z), NIR (I) and LIENER (IE). Accentuated response to raw soyabean meal by meal feeding. *Arch. Toxicol. Suppl.* 6; 1983; 177-81

- 3815 CHOPRA (CS), MITAL (BK) and SURJAN SINGH. Preparation of a yoghurt like product from soyabeans. *J. Food Sci. Technol. (India)* 21(2); 1984; 81-84

Yoghurt like product was prepared from soyamilk alone and after adding 10, 20 and 30% skim milk. Soyamilk was supplemented with 1% sucrose (w/v) and was inoculated with cultures of *Streptococcus thermophilus* and *Lactobacillus acidophilus* individually and together and the growth was followed over 16 hours period. Mixed cultures produced more acid than any single culture; addition of skim milk further enhanced acid production. Sensory evaluation revealed absence of beany flavour in all the products; fermentation with mixed cultures gave better product than those fermented with single culture. Incorporation of skim milk up to 20% enhanced acceptability. 20% weakened the body of the product.

SUNFLOWER

- 3816 EGUIAZU (GM) and FRANK (HK). Counts of fungal propagules and acid number in sunflower seeds. *Fette Seifen Anstrichm.* 86(1); 1984; 16-8

GROUNDNUT

- 3817 BROWN (GH). The distribution of total aflatoxin levels in composited samples of peanuts. *Food Technol. Aust.* 36(3); 1984; 128-30

MACADAMIA

- 3818 ROSENTHAL (I), MERIN (U), BASKER (D) and KADMAN (A). A study of macadamia nuts of "yonik" variety. *J. Food Quality.* 7(1); 1984; 67-73

TUBERS AND VEGETABLES

- 3819 WILKINSON (AP), RHODES (MJC) and FENWICK (RG). Myrosinase activity of cruciferous vegetables. *J. Sci. Food Agric.* 35(5); 1984; 543-52

Myrosinase activity in partially purified extracts of 12 cruciferous vegetables was determined by the initial rate of glucose formation from glucosinolate hydrolysis using a coupled assay. The effect of ascorbate concentration upon the myrosinase activity of six of the crucifers studied and the white mustard preparation revealed that the ascorbate concentration necessary to promote maximal activity varied with species. KAR

- 3820 SANNI (SB). A survey of nitrate - Nitrite in vegetables in benin environs. *J. Plant. Food.* 5(2); 1983; 75-9

Nitrate and nitrite were determined simultaneously in some common vegetables in the Benin environs by the standard addition method using a nitrate electrode. The nitrate content ranged from 400-1600 ppm while no nitrite was detected. The nitrate values mostly exceeded WHO recommended maximum levels. There was a 96-101% recovery of added nitrite. There was no appreciable loss of nitrate on storage in a refrigerator for 48 hours. AA

- 3821 JOSHI (HC) and DUBE (SD). Nutritional significance of vegetables grown in hills. *Indian Hortic.* 29(1); 1984; 23, 25-6

POTATO

- 3822 BURTON (WG). The potato. *J. Plant. Food.* 5(2); 1983; 53-66

Area, production, yield and consumption of potato in major producing countries and the origin and domestication of potato have been discussed in this article. BSN

- 3823 DAVIES (AMC) and BLINCOW (PJ). Glycoalkaloid content of potatoes and potato products sold in the UK. *J. Sci. Food Agric.* 35(5); 1984; 553-7

- 3824 MORRIS (SC) and LEE (TH). The toxicity and teratogenicity of Solanaceae glycoalkaloids, particularly those of the potato (*Solanum tuberosum*): A review. *Food Technol. Aust.* 36(3); 1984; 118-24

Aspects covered include chemistry of glycoalkaloids; levels of glycoalkaloid in potatoes; economic significance of glycoalkaloids, technological significance and toxicity of glycoalkaloids to man and animals, mechanism of toxicity and teratogenicity KAR

- 3825 RACUSEN (D) and WELLER (DL). Molecular weight of patatin, a major potato tuber protein. *J. Food Biochem.* 8(2); 1984; 103-7

Patatin, a major protein of potato tubers, exists as a 88±4 kilo dalton dimer in dilute buffers at pH 7 or 9.6. The dimer was found in fresh as well as liophilized preparations. Treatment with SDS resulted in dissociation to monomer. AA

- 3826 RIDLEY (SC) and LINDSAY (RC). Evaluation of factors affecting predictability of mealy textures in potatoes. *J. Food Quality.* 7(1); 1984; 1-16

Storage treatments of short time and high (75 C) temperature resulted in potatoes of greater mealiness than treatments of long storage time and low (15 c) temperature. There was no correlation between shear of raw and extrusion force evoked potatoes. Extrusion was correlated with starch content. KAR

- 3827 CAIRNS (T), SIEGMUND (EG) and SAVAGE (TS). Persistence and metabolism of aldicarb in fresh potatoes. *Bull. Environ. Contam. Toxicol.* 32(3); 1984; 274-81

The major carbamate residue detected in fresh potatoes by employing methane and ammonia chemical ionization (CI) GCMS was aldicarb sulfone which was present at a level of about 1 ppm in the tuber. BSN

SWEET POTATO

- 3828 WALTER (WM) Jr., COLLINS (WW) and PURCELL (AE). Sweet potato protein: A review. *J. Agric. Food Chem.* 32(4); 1984; 695-9

Sweet potato 60-85% of proteinaceous nitrogen of which 90% is amino or amide nitrogen. Protein isolate of sweet potato has a PER comparable to casein. Sulphur amino acids are first limiting. Other limiting amino acids could be lysine and tryptophan. Heat treatment can affect the bioavailability of protein. JVS

CASSAVA

- 3829 RAJA (KCM), EMILIA ABRAHAM and MATHEW (AG). Effect of roasting on amylose content and textural quality of cassava (*Manihot esculenta* Crantz). *J. Food Sci. Technol. (India)* 21(2); 1984; 76-8

Flours from tubers of 7 cultivars of cassava were pan roasted at 101-104 C for 14-15 minutes after raising the moisture content to about 26% to reduce their stickiness while steam-cooking. The total and insoluble amylose content increased while roasting. Stickiness of steam-cooked flours was less in roasted flour. Intervarietal relationship between insoluble amylose content and stickiness score was not consistent. KAR

BRUSSELS SPROUT

- 3830 MILLER (KW) and STOEWESAND (GS). Dietary brussels sprouts and glucosinolate influence on rat hepatic polysubstrate monooxygenases. *J. Plant Food.* 5(2); 1983; 67-74

LETUCE

- 3831 CARBALLIDO (A) and ANTONIA NAVARRO (M). Micronutrients in lettuce, endive and witloof. I. Vitaminic content. *Anal. Bromatol.* 35(1); 1983; 123-34 (Spanish)

Vitamins C, B₁, B₂ and carotenes or provitamin A in lettuce, endive and 'witloof' were determined. Utilized methods are described. The resulting data in three salads are compared and conclusions are described. AA

TOMATO

- 3832 GARCIA PUERTAS (PP), TORIJA ISASA (ME) and ORZAEZ VILLANUEVA (MT). Mineral elements in fresh tomato and canned tomato products. II. Microelements. *Anal. Bromatol.* 35(1); 1983; 157-65 (Spanish)

A research has been done about amounts of Fe, Cu, Mn and Zn in tomato. We have studied fresh and home fried tomato and several kinds of canned products. Atomic absorption has been used for the determination of all these elements. AA

- 3833 RUSSELL (LF) and MULLIN (WJ). The variation of vitamin C concentration in canned tomato juice. *Food Sci.+ Technol.* 17(1); 1984; 27-8

A survey of the vitamin C content in commercially canned tomato juice samples is presented. The vitamin level over 3 crop years varied between 6.5

and 15.1 mg/100 g juice. Short term refrigerated storage of opened cans had little effect on the total vitamin C levels. AA

OKRA

- 3834 STIPANOVIC (RD), DONOVAN (JC), BELL (AA) and MARTIN (FW). Factors interfering in gossypol analysis of *okra* and glandless cottonseed using direct aniline extraction. *J. Agric. Food Chem.* 32(4); 1984; 809-10

Okra (*Abelmoschus esculentus*) had shown the presence of terpenoid aldehyde-gossypol, by a colorimetric method involving reaction with phloroglucinol. TLC of *okra* extracts by the present authors did not reveal any gossypol. Oxidation products of hydroxylated unsaturated fatty acid triglycerides were found to give a false reading with aniline and phloroglucinol in *okra* and cottonseed. JVS

BELL PEPPER

- 3835 CAPPELLINI (MC), LACHANCE (PA) and HUDSON (DE). Effect of temperature and carbon dioxide atmospheres on the market quality of green bell peppers. *J. Food Quality* 7(1); 1984; 17-25

Freshly harvested green peppers, Lady Belle variety, were stored under air and carbon dioxide atmospheres of 5%, 10% and 20% for 3, 6 and 9 days at 2 C and 8 C to simulate in-transit storage. An additional three day storage at 25 C in air was utilized to simulate accelerated retail holding. Results indicate that a temperature lower than 8 C and an elevated atmospheric carbon dioxide content, significantly accelerate the incidence of visual decay (soft rot), especially after 9 and 12 days of total storage. Concomitant changes occur in the flavour and textural properties of peppers under these conditions. Temperatures, carbon dioxide concentration and time do not significantly influence the colour or total ascorbic acid content. The use of carbon dioxide atmospheres during storage cannot be recommended. Storage at 8 C in air as is the current recommended practice would appear to provide optimal and lowest cost conditions. AA

PLANTAIN

- 3836 OLORUNDA (AO) and AWORH (OC). Effects of Tal Pro-Long, a surface coating agent, on the shelf-life and quality attributes of plantain. *J. Sci. Food Agric.* 35(5); 1984; 573-8

The effects of Tal Pro-Long, a commercial fruit coating, on the shelf-life and selected quality attributes of plantain were investigated. Relative to untreated fruits, yellow colour development was retarded by 4 to 8 days, and changes in pH and total acidity were delayed in plantain dipped in 1.5% or 2.5% Pro-long solution when stored at 30 C or at 20-24 C. Pro-long treatment had less effect on the pulp:peel ratio of plantain and on changes in moisture contents of pulp and peel during storage. After ripening, fruits dipped in 1.5% Pro-long solution produced an acceptable, though slightly inferior, fried plantain product relative to untreated fruits. AA

BITTER GOURD

- 3837 AWASTHI (MD) and LALITHA ANAND. Fate of quinalphos and monocrotophos residues on bitter gourd fruits. *J. Food Sci. Technol. (India)* 21(2); 1984; 113-5

Quinalphos (O,O-diethyl O-quinoxalin-2-yl phosphorothioate) and monocrotophos (dimethyl(E)-1-methyl-2-methyl carbamoyl, vinyl) were sprayed at 0.05 and 0.1% concentration at fruiting stage to bitter gour. (*Momordica charantia*) and the persistence of residues upto 21 days was determined. The residue at 0.05 and 0.1% concentration reached below detectable limit after 7 and 15 days of treatment, respectively in case of quinalphos and 10 and 15 days of treatment in monocrotophos respectively. KAR

FRUITS

- 3838 ANON. Confructa - Statistics. *Confructa*. 28(1); 1984; 86-90 (German)

World production of grapes, apples, oranges, grapefruit and pomelo, mangoes, and pineapples, in the years 1980, 1981, 1982, has been reported. Import and export figures for the group oranges, tangerines, and clementines have also been given. Production figures for West Germany (1982, 1983) have been reported separately. Trade statistics relating to West Germany have been given. KMD

- 3839 RAEV (ND), TANCHEV (SS) and SHARMA (RC). Adhesion characteristics of isolated wax substances from fruit cuticles related to osmotic dehydration of whole fruits. I. Effect of temperature and preliminary treatment. *J. Food Process. Preserv.* 8(1); 1984; 15-29

Adhesion behaviour of cuticular wax isolated from cherries, plums and grapes, in a 70% sucrose solution, is the subject of discussion in the present work. Criterion is suggested for estimation of the effectiveness of preliminary treatment and temperature conditions in osmotic treatment of whole fruits. An apparatus is described for the determination of the contact angle θ_{slv} according to the method of the lying drop. Calculations are made of the energy characteristics, the energy of wetting W_{slv} and the adhesion work A_{slv} of the three phase contact, isolated cuticular wax/70% sucrose solution/air, at temperatures from 20 C to 80 C. AA

- 3840 NAGARAJA (KV) and KAPUR (OP). Quality control for fruit and vegetable processing. *Indian Food Packer*. 38(3); 1984; 51-7

General guidelines for organisation of quality control system for fruit and vegetable processing industry to conduct analysis and testing of products for Prevention of Food Adulteration Act and Fruit Product Order specifications, along with details for starting such laboratories in the medium and small scale/cottage scale have been presented and discussed. BSN

- 3841 WILLS (RBH), WIMALASIRI (P) and GREENFIELD (H). Dehydroascorbic acid levels in fresh fruit and vegetables in relation to total vitamin C activity. *J. Agric. Food Chem.* 32(4); 1984; 836-8

- 3842 KAMALJEET SINGH. Bright future for processed fruits and vegetables. *Indian Food Packer*. 38(3); 1984; 11-5

Aspects covered include, aseptic packaging; capacity utilisation; employment potential, rationalisation of taxes; upgrading technology; links with growers; and future prospects. BSN

DATE

- 3843 SUMAINAH (GM) and HAZMA AL-NAKHAL. Tamar Eddin: a new product of date. *J. Food Sci. Technol.* (India) 21(2); 1984; 88-91

A dried product from date called Tamar Eddin was prepared in the same way as the popular Kamar Eddin prepared from apricot juice. The product was prepared from Rezaiz variety of date, and the effect of citric acid, (0.82-5 g/kg), ascorbic acid (5 g/kg) corn syrup (110-220 g/kg) and SO₂ (84-4020 ppm) on the quality of the product was studied. The product contained moisture 16.52-19.42%; total solids, 80-62 to 83-52%, total sugars, 74.3 to 78.2% and acidity 0.42-2.63%. SO₂ at higher levels (3354-4020 ppm) imparted good colour. Addition of 1% citric acid, with 167-335 ppm of SO₂ gave a product with acceptable colour, texture and taste as judged by a panel members; corn syrup makes the product elastic. KAR

PINEAPPLE

- 3844 CAIRNS (T), SIEGMUND (EG), DOOSE (GM), LANGHAM (WS) and CHIU (KS). Quantification of carbaryl in pineapples by HPLC and GCMS-CI-NH₃. *Bull. Environ. Contam. Toxicol.* 32(3); 1984; 310-15

A comparison of the data obtained for five pineapple samples (excluding crown and leaves) for the carbamate levels present therein by employing (a) GCMS-CI-NH₃ and (b) HPLC revealed that the levels were for (a) 0.21, 0.42, 1.80, 0.26 and 0.16 ppm and (b) 0.54, 0.40, 1.60, 0.22 and 0.15 ppm respectively. The coefficient of correlation by HPLC was excellent (> 0.99). However, the lower value (0.95) obtained by GCMS did not effectively reduce the reliability or impact of the data. BSN

GRAPE

- 3845 WILSON (B), STRAUSS (CR) and WILLIAMS (PJ). Changes in free and glycosidically bound monoterpenes in developing Muscat grapes. *J. Agric. Food Chem.* 32(4); 1984; 919-24

Five phases were distinguished in the development of free and glycosidically bound monoterpenes in *Vitis vinifera* cv. Muscat or Alexandria. At berry set, high concentrations of free and bound geraniol were observed; approaching veraison, levels of all terpenes decreased; during sugar accumulation terpene concentrations increased and several monoterpenes reached peak levels in the overripe fruit. After veraison, linalool, geraniol, nerol, α -terpineol, and the furan linalool oxides were present mainly as glycosides. While the total concentration of glycosides increased with ripening, only free linalool showed development paralleling that of its glycoside. At grape maturity, the level of (E)-3,7-dimethylocta-1,5-diene-3,7-diol was greater than the total concentration of all other monoterpenes. AA

- 3846 INTERESSE (FS), ALLOGGIO (V), LAMPARELLI (F) and D'AVELLA (G). Characterization of the oxidative enzymatic system of the phenolic compounds from Muscat grapes. *Food Sci. + Technol.* 17(1); 1984; 5-10

- 3847 SHIRZAD (BM) and LANGERAK (DIs). Gamma radiation technological feasibility of increasing shelf-life of table grapes. *Acta Aliment.* 13(1); 1984; 47-64
- Gamma radiation (1 and 2 k Gy) and different sources of sulphur dioxide (0.25% SO₂, 4 g K₂S₂O₅, 4 g K₂S₂O₅ + 4g C₆H₈O₇ per kg grapes) and moist

air heat (55 C for 15 minutes) were employed to increase the shelf-life of Black Alicante table grapes stored at 10 C and 95% RH. The grape clusters were placed on foam polystyrene trays and packed with polyvinyl chloride film. It was found that sulphur dioxide may prevent decay at low storage temperatures (-1 to +1 C) but does not prevent decay at higher temperatures. But 1 kGy gamma irradiation in combination with 0.25% SO₂ controlled moulding for the entire storage period of 40 days. When the temperature of storage and transport was 10 C, the best treatment for increasing the shelf-life of the grapes was a gamma radiation dose of 2 kGy applied to pre-packed grapes. KMD

- 3848 PHILLIPS (DJ), AUSTIN (RK), FOUSE (DC) and MARGOSAN (DA). The quality of early-season table grapes fumigated with methyl bromide and sulphur dioxide. *Hortscience* 19(1); 1984; 92-3

BANANA

- 3849 WILLS (RBH), LIM (JSK), and GREENFIELD (H). Changes in chemical composition of 'Cavendish' banana (*Musa acuminata*) during ripening. *J. Food Biochem.* 8(2); 1984; 69-77

Green 'Cavendish' bananas were exposed to ethylene for 16 hours and the subsequent development of ripening at 20 C was followed in terms of skin colour, respiration and ethylene production. At six stages of ripeness, as determined by skin colour, pulp tissue was analysed for firmness and for water, protein, fat, individual sugars, starch, dietary fibre, organic acids, ash, soluble solids, pH, vitamin C, thiamin, riboflavin, niacin, carotenes, sodium/potassium, calcium, magnesium, iron and zinc; energy content and edible weight were calculated. AA

LIME

- 3850 NYAMBATI (MGD) and LANGERAK (DIs). Effect of mild heat, potassium metabisulphite and/or gamma irradiation on storability of lime fruits. *Acta Aliment.* 13(1); 1984; 65-8

The irradiation dose required to prevent *Penicillium digitatum* rot in lime fruits could be effectively reduced by combining a mild heat treatment at 45 C for 5 minutes, and/or 0.5% K₂S₂O₅ dip for 5 minutes, with subsequent radiation treatment at doses below the thresholds above which adverse changes occur in the fruit. KMD

ORANGE

- 3851 LANE (AG). Anaerobic digestion of orange peel. *Food Technol. Aust.* 36(3); 1984; 125-7

Anaerobic digestions fed with waste orange peels are stable at loading rates up to 3.5 kg total solids (TS)/m³d. if the amount of peel oil introduced into the digestion is less than 0.075 g/L digestion liquor per day. The yield of gas (50-55% methane) is 0.5 m³/kg of TS; conversion of solids to gas approaches 100%. Oil content of peels can be reduced to non-toxic levels using commercial oil recovery equipment. Presence of aromatic acids in digestion liquors cannot serve as an indication of toxicity or overloading. AA

MANGO

- 3852 RAM (HB), SINGH (RV), SINGH (SK) and JOSHI (MC). A note on the effect of ethrel and hot water dip treatment on the ripening and respiratory activities of mango variety Dashehari. *J. Food Sci. Technol. (India)* 21(2); 1984; 92-3

Mature green mangoes (Dashehari variety) were dipped either in hot (53 + 1 C) water for 5 minutes or in ethrel of concentration 250-1000 ppm for 5 minutes or in hot water and in ethrel (500 ppm) for 5 minutes and stored at 29-35 C and RH 59-75% for ripening. All fruits treated with either hot water or ethrel up to 500 ppm ripened after 4 days unlike in other treatments where all fruits did not ripen at the same time. Hot water and with ethrel treatment was better than all other treatments as there was no spoilage even after 8 days; ethrel at > 500 ppm induced off flavour, altered taste and reduced shelf-life of fruits. KAR

- 3853 REDDY (SM) and LAXMINARAYANA (P). Post-infection changes in ascorbic acid contents of mango and amla caused by two fruit-rot fungi. *Curr. Sci.* 53(17); 1984; 927-8

Mango (*Mangifera indica* Linn) and amla (*Phyllanthus emblica* Linn.) were inoculated with *Phomopsis mangiferae* Ahmad and *Phoma exigua* Desm. respectively and incubated for 8 days. Fresh mango and amla contained 98.2 and 402.7 mg/100 g of ascorbic acid before incubation. The decrease in ascorbic acid was 19.5% in fresh and 97.5% in infected mango fruit. Whereas in amla, the decrease was 6.6% in fresh and 87.0% in infected fruits. KAR

CHERRY

- 3854 CZABAFFY (A). Attempts to elaborate a non-destructive optical method for measuring cherry-ripeness. *Acta Aliment.* 13(1); 1984; 83-95

Studies were made on cherries (variety Bigarreau-Burlat) in 1980 to establish equations for predicting the ripeness of cherries by non-destructive optical measurements, and to get ready-to-use data for elaborating a single purpose instrument predicting the ripeness of cherries. It was found that prediction of ripeness is possible by measuring log I/T values in the visible spectrum region, at two wave-lengths. But the choice of the "best" wavelength-pair is problematical, because the correlation surface above the wavelength pair plane is rather flat over a considerable region. Besides, the pigment content is not the single factor indicating ripeness. The problem, therefore, cannot be said to be solved. KMD

APPLE

- 3855 NADUDVARI-MARKUS (V) and VAMOS-VIGYAZO (L). Enzymatic browning substrates in apple cultivars. *Acta Aliment.* 13(1); 1984; 97-106

The O-dihydroxy-phenol composition of the mesocarp of three apple cultivars - Jonathan, Golden Delicious, and Starking - was compared by two-dimensional, thin-layer chromatography on MN300 cellulose chromatoplates. On spraying the plates with Hoepfner reagent, six identical compounds were detected in the chromatogram of all the three cultivars. However, the relative proportions of these compounds differed from one cultivar to another, and some additional differences were also revealed. Such differences may be of help in interpreting the enzymatic browning behaviour of the cultivars investigated. KMD

- 3856 ABBOTT (JA), WATADA (AE) and MASSIE (JR). Sensory and instrument measurement of apple texture. *J. Am. Soc. Hortic. Sci.* 109 (2); 1984; 221-8

Sensory crispness, hardness and toughness were closely related to each other and to Instron texture profile forces at breakpoint (yield correlations of sensory attributes) with the best single Instron texture. Profile variables were similar in those with Magness-Taylor penetration force, however, combinations of several texture profile variables in regression equations, generally improved prediction of sensory attributes. KAR

- 3857 PROEBSTING (EL), DRAKE (SR) and EVANS (RG). Irrigation management, fruit quality, and storage life of apple. *J. Am. Soc. Hortic. Sci.* 109(2); 1984; 229-32

Apples from the trickle-irrigated trees had less water content and higher soluble solids than those from sprinkle-irrigated trees. Titratable acidity tended to be lower. Firmness at harvest was similar regardless of irrigation procedure. Storage life was not influenced consistently by irrigation. KAR

- 3858 LEE (S-L), VELASQUEZ (A) and KAPLAN (HJ). Factors influencing diphenylamine residues on apples. *Hortscience* 19(1); 1984; 94-5

When diphenylamine (DPA) bath temperature was at 35 C, DPA residue on fruit of apple was higher than at 5 C to 21 C. Residue was less at 4 C. DPA concentration in the bath from 0 to 2500 ppm increased DPA residues. Dipping time of 30 sec. was sufficient to obtain the desired residue level; addition of 3% calcium chloride and 500 or 1250 ppm of surfactant did not influence DPA uptake. KAR

ANNONA ATEMOYA

- 3859 WILLS (RBH), POI (A) and GREENFIELD (H). Postharvest changes in fruit composition of *Annona atemoya* during ripening and effects of storage temperature on ripening. *Hortscience* 19(1); 1984; 96-7

Fruits were stored at 20 C from preclimacteric to postclimacteric stages. The major changes during ripening were a continuous decrease in starch, a continuous increase in fructose and glucose, an increase in sucrose to a maximum at the climacteric, an increase in malic acid early in the climacteric rise and a decrease in vitamin C after the climacteric. Eating quality was optimal 2 days after the climacteric. The safe range of storage temperature was between 15 and 25 C with 20 C being optimum for the development of eating quality. KAR

JAMS

- 3860 VALLETRISCO (M), RUGGIERI (G), NIOLA (I) and RUGGERI (P). Investigation on patulin in jams, products widely used in child feeding. *Ind. Aliment.* 22(9); 1983; 636-9 (Italian)

SUGAR, STARCH AND CONFECTIONERY

GLUCOSE SYRUP

- 3861 JACKSON (EB). Glucose syrup. *Confect. Prod.* 50(7); 437, 445, (8) 457-89; 1984

STARCH

- 3862 TEGGE (G) and MEYER (H). Source material from grain for chemical technical application - demonstrated with dialdehyde starch. *Getreide Mehl Brot.* 38(3); 1984; 86-9 (German)

With the objective of using starch and its derivatives as alternative raw materials in synthetic chemistry, attention has been focussed on a selective oxidation product of starch, namely, dialdehyde starch (DHS). A new structural formula for dialdehyde starch has been proposed, which corresponds more closely to the facts than the older Haworth's formula. A comprehensive description of the physical and chemical properties of DHS is followed by a discussion of its functional properties and possible areas of application of DHS as well as its hydrolysis products. The fundamentals of DHS production have been mentioned briefly. DHS is of very little use in the food industry. KMD

- 3863 WOLEVER (TMS), CHAN (C), LAW (C), BIRD (L), RAMDATH (D), MORAN (JJ) and JENKINS (DJA). The *in vitro* and *in vivo* anti-amylase activity of starch blockers. *J. Plant Food.* 5(1); 1983; 23-30

The *in vitro* anti-amylase activity of three different starch blockers and anti-amylase tablets derived from legume protein concentrate, was compared with that of acarbose, a bacterial α -glucoside hydrolase inhibitor also containing anti-amylase activity. The potency of each of the starch blocker tablets was approximately equal, one tablet containing the same anti-amylase activity as 0.24 mg of acarbose. There was no significant reduction of the blood glucose response when 1,2,3,4 or 10 starch-blocker tablets were given to 4 to 7 normal volunteers 5 minutes before a test meal containing 50 g carbohydrate as white bread. AA

CONFECTIONERY

- 3864 LANGAN (RE). Food starch technology. Confectionery applications. *Manuf. Confect.* 64(1); 1984; 45-8
- 3865 DAVIS (J). Raw material quality control and specification. *Manuf. Confect.* 64(1); 1984; 51,54

CHOCOLATE

- 3866 ANON. The Wiener system for processing chocolates or similar products. *Confect. Prod.* 50(8); 1984; 470,476
- 3867 KLEINERT (J). Tempering of melted chocolate masses. *Ind. Aliment.* 23(1); 1984; 13-22 (Italian)

This short review covers: (a) the technology of the tempering procedure which is nothing but a pre-crystallization of the cocoa butter or fat

mixture present in the product; (b) the heat cycle of tempering; and (c) some of the equipment and principle employed in the processes. KMD

- 3868 MAIWALD (HJ), TIETZE (W), GREILING (B), CALLMEIER (S) and BANOCZY (J). Cariogenicity of saccharose, xylitol, mannitol, sorbitol, and fructose containing chocolates. *Ernährungsforschung*. 29(1); 1984; 10-11 (German)

Chocolate is counted among the strongly cariogenic foods because of its high sugar content, its sticky consistency, and its frequent consumption between principal meals. The cariogenic potential of 8 different chocolates (some of them being trial products) was examined by means of oral plaque pH telemetry. Products which proved to be non-cariogenic were bitter chocolates with xylitol and sorbitol, and milk chocolates with xylitol and mannitol; on the other hand, milk chocolates with fructose, and light-coloured milk chocolates with xylitol proved to be cariogenic. KMD

- 3869 CLARKE (R). Economy in chocolate and coating usage. *Confect. Prod.* 50(7); 1984; 414,445

CARAMEL

- 3870 DUCHOW (R). Milk products in caramel manufacturing. *Manuf. Confect.* 64(2); 1984; 21

- 3871 MODI (RP) and PAI (JS). Suitability of some organic amino compounds in caramel preparation. *J. Food Sci. Technol.* (India) 21(2); 1984; 102-4

Use of NH_3 in caramel preparation from corn syrup produces a toxic compound known as 4-methylimidazole. Several organic ammonia compounds and commercial samples were used in place of NH_3 and the colour intensities of caramel was determined at 420 and 600 nm. Of the different substitutes, methyl-amine, diethylamine and t-butylamine gave good colour, ethylene diamine proved the best substitute for NH_3 ; the properties of caramel obtained by using ethylene diamine was studied and compared with those of commercial caramel.

CANDY

- 3872 FEULING (J) and HILL (W). The repositioning of candy as a snack food. *Manuf. Confect.* 64(2); 1984; 29-31

BAKERY PRODUCTS

BREAD

- 3873 BRUMMER (J-M) and SEIBEL (W). Reflections of food-legislative aspects in the manufacture of sourdough bread as well as country and farm-style bread. *Dtsch. Lebensmittel-Rundschau*. 80(1); 1984; 5-10 (German)

- 3874 SPICHER (G). Causes of mould development in baked goods. I. Moulds occurring on packed, sliced bread. *Getreide Mehl. Brot*. 38(3); 1984; 77-80 (German)

437 packages of sliced bread, from different sources, were stored for 14 days at 25 C and 70% RH. Mould formation was observed in 287 samples

(65.7%) after a period of 7 days; out of these, 137 had been treated with either propionates or sorbic acid. *Penicillium roqueforti* was identified as the cause of green and grey moulding in 245 (91%) of the cultures. The organisms causing "chalky mould" (6.6% of the total) were identified as *Zygosaccharomyces baillii* (7 isolates), *Endomyces fibuliger* (6 isolates), *Hyphopichia burtonii* (3 isolates), *Saccharomyces cerevisiae* (2 isolates), and *Torulaspora delbrueckii*. KMD

- 3875 RIISOM (T), KROG (N) and ERIKSEN (J). Amylose complexing capacities of *cis*- and *trans*-unsaturated monoglycerides in relation to their functionality in bread. *J. Cereal Sci.* 2(2); 1984; 105-18

The functionalities of saturated/unsaturated monoglycerides in bread and their reactions with amylose to form inclusion compounds have been investigated. JVS

- 3876 SEIBEL (W). Results of the 25th Quality Test of wheat breads and other baked goods. *Getreide Mehl Brot.* 38(3); 1984; 81-6 (German)

787 samples of bread and fine baked goods were submitted for the DLG quality tests in 1983 - a rise of 19.2% compared to 1982. Out of 252 samples of wheat bread 11.9% received the grand prize, 39.7% the silver prize, and 31% the bronze prize. Among the 535 samples of fine baked goods, 9.9% were awarded the grand prize, 30.5% the silver prize, and 34.4% bronze prize. The results of 1983 were even better than the good results of 1982. The 5- point test scheme proved to be very effective once again. KMD

- 3877 SCHIEBERLE (P) and GROSCH (W). Investigations on flavour substances in the crust of rye bread. *Getreide Mehl Brot.* 38(3); 1984; 76-77 (German)

By the combined use of gas-chromatographic and "sniffing" techniques, 39 compounds present in rye bread crust could be identified by chemical and instrumental methods. Their aroma quality was also determined. KMD

TORTILLA

- 3878 ISLAM (MN), LIRIO (ME) and DELVALLE (FR). Mold inhibition in tortilla by dimethyl fumarate. *J. Food Process. Preserv.* 8(1); 1984; 41-5

MILK AND DAIRY PRODUCTS

- 3879 HUGGINS (AR). Progress in dairy starter culture technology. *Food Technol.* 38(6); 1984; 41-50

Review covers the use of mesophilic lactic streptococci dairy starters and different approaches for overcoming the difficulties faced by way of bacteriophage inhibition. Improvements in methods of starter selection and production, preparation of bulk starter, culture use with/without rotation of strains, development of phage insensitive strains, and use of recombinant DNA technology have been discussed. JVS

MILK

- 3880 HOYLE (JB) and BURTON (H). The problem of cream plug in bottled unhomogenized pasteurized milk. *J. Soc. Dairy Technol.* 37(2); 1984; 42-5

Factors encouraging plug formation include, mechanical stress during handling of milk, excessive pasteurization temperature, multiple pasteurization, and failure to keep the milk cool during distributions. KAR

- 3881 WILLIAMS (GR). Use of bioluminescence in the determination of the antibiotic content of milk. *J. Soc. Dairy Technol.* 37(2); 1984; 40-41

This note describes the use of Lumac Biocounter M2000 in the estimation of the penicillin content of milk. KAR

- 3882 O'CONNOR (F). Rapid test methods for assessing microbiological quality of milk. *Aust. J. Dairy Technol.* 39(3); 1984; 61-5

Different methods available have been reviewed. KAR

- 3883 MUIR (DD), BANKS (W), GOLIGHTLY (SJ) and SWEETSUR (AWM). Preparation and properties of a new generation of in-can sterilized skim-milk based concentrates. *J. Food Technol.* 19(3); 1984; 369-76

Pilot-scale production of a range of novel heat stable concentrates is described. The concentrates containing *circa* 40% total solids - largely milk protein and various sugars - were favourably compared with conventional evaporated milk and exhibited exceptional storage stability. AA

MILK POWDER

- 3884 BEEVER (P). Spontaneous ignition of milk powders in a spray-drying plant. *J. Soc. Dairy Technol.* 37(2); 1984; 68-71

Spray drying plants used for skimmed milk and fat filled powders could undergo spontaneous ignition in certain circumstances. The thicknesses of powder deposit on the spray-drier walls necessary for there to be a risk of self ignition were calculated. Mechanism for the occurrence of fins in the fluid bed instantizers are also put forward. Preventive measures are suggested. KAR

- 3885 KIESEKER (FG) and CLARKE (PT). The effect of storage on the properties of non-fat milk powders. *Aust. J. Dairy Technol.* 39(3); 1984; 74-7

The storage stability of low-, medium- and high-heat non-fat milk powders has been investigated over the temperature range of 10-40 C, with particular reference to changes in functional properties. At a moisture content of less than 4% only minor changes occurred in powders stored at up to 20 C. At higher storage temperatures there was a reduction in heat stability, an increase in the inherent viscosity, an extension of the rennet coagulation time and a lowering of the curd tension of the relevant powders. These modifications were accompanied to a variable extent by associated changes in solubility indices and pH values of the stored powders. AA

KHOA

- 3886 SAI PRAKASH AND SHARMA (RS). Composition and storage characteristics of khoa made from lactose hydrolysed buffalo milk. *J. Food Sci. Technol. (India)*. 21(2); 1984; 78-81

Lactozyme (β -D-galactosidase) was added at 1 ml/l of buffalo milk at 40 C and the extent of hydrolysis was recorded at 30 minutes interval for 120 minutes. Khoa was prepared from lactose unhydrolysed (LUM) and lactose hydrolysed milk (LHM). Khoa was stored for 144 hours and the changes in

acidity, tyrosine content, free fatty acids and peroxide value were recorded. Lactozyme hydrolysed 50, 71 and 90% of lactose in 30, 60 and 120 minutes. The lactose and hydroxymethyl furfural content of LHM Khoa was 2.56% and 61.28 $\mu\text{M}/100\text{ g}$ as against 23.4% and 14.28 $\mu\text{M}/100\text{ g}$, respectively in LUM. Khoa from LUM showed higher proteolysis and lipolysis and was susceptible to mould attack within 3-4 days, but khoa from LHM had higher peroxide value, and was free from mould attack for 30 days; it was brown possessing sweet taste with soft uniform body and texture. KAR

- 3887 VARADARAJ (MC) and NAMBUHURIPAD (VKN). Effect of Khoa preparation on cell population of *Staphylococcus aureus*. *J. Food Sci. Technol.* (India). 21(2); 1984; 84-7

The effect of heat treatment (98 C for 15-20 minutes) in the preparation of khoa on the cell population of *Staphylococcus aureus* was studied using 4 wild strains (K-283, K-192, K-213 and K-208) isolated from market Khoa and 2 standard strains (A₁₀₀ and B₅₋₆). The initial count of 10^8 - 10^9 colony forming units (CFU)/ml found in milk on preparation of Khoa showed a cell count range of 2×10^2 - 1×10^4 CFU/g; the colonies were smaller in diameter (1 mm) on Baird-Parker medium even after 72 hour of incubation at 37 C. probably due to the heat injury. Colonies of K-283 and K-213 showed curled margin instead of smooth margin. When the initial inoculation to milk was lowered from 1×10^5 to 1×10^3 CFU/ml there was a marked decrease in Staphylococcal levels (4×10^4 to 4×10^2) in fresh Khoa for a week. The heat injured Staphylococci were also grew, when Khoa was stored at 25-35 C for a week or when the samples were enriched with brain heart infusion and stored for 24 hour at 37 C. KAR

BUTTER

- 3888 WILLIAMS (GR). Determination and control of the moisture and salt content of butter. *J. Soc. Dairy Technol.* 37(2); 1984; 66-8

This paper compares the methods of moisture and salt determination and assess the savings derived from the use of on-line sensors for measuring and controlling both the moisture and salt content of butter produced by a continuous butter maker. KAR

- 3889 MARQUINA (AD) and CARBALLIDO (A). Determination of vitamins A and E in commercial butters by high pressure liquid chromatography. *Anal. Bromatol.* 35(1); 1983; 135-9 (Spanish)

Vitamins A and E contents in sixteen samples of commercial butters has been determined, by HPLC. From the results obtained, summarized in several tables, it can be deduced that some commercial butters are rich in these vitamins, since data found, are higher than those shown in the food composition tables. AA

GHEE

- 3890 SWARNLATA, SIDDIQUI (MKJ) and SETH (TD). Chlorinated pesticide residues in desi ghee. *J. Food Sci. Technol.* (India) 21(2); 1984; 94-5

Ghee (42 samples) collected from Lucknow and Sitapur districts of U.P. were analysed for organochlorine pesticide residues using GLC. All the samples were contaminated with HCH (hexachlorocyclo hexane) and DDT (Dichloro diphenyl trichlorethane) residue. It was found that samples from Sitapur had higher levels of HCH and DDT as compared to those from Lucknow. Samples

from Sitapur contained 4.00 ppm of HCH and 23.8 ppm of total DDT as against 1.88 ppm of HCH and 20.35 ppm of total DDT in Lucknow samples. KAR

WHEY

- 3891 ANON. Immobilised enzyme and fermentation technologies combined to produce baker's yeast from whey. *Food Technol.* 38(6); 1984; 26-7

Cottage cheese whey has high B.O.D. and posed a serious disposal problem for an industry. The utilisation of lactose present at a level of about 5% in whey was difficult. The lactose was hydrolysed into glucose and galactose by using an immobilised lactase; the mixture of the two monosaccharides proved good substrate for industrial scale production of baker's yeast (*S. cerevisiae*). In the immobilised enzyme system developed for this process, lactase was covalently bonded to a controlled pore silica bead using a silane/glutaraldehyde technique. The fermentation process followed by industry is described. JVS

MEAT AND POULTRY

MEAT

- 3892 ZIEGLER (GR) and ACTON (JC). Mechanisms of gel formation by proteins of muscle tissue. *Food Technol.* 38(5); 1984; 77-80, 82

The article discusses: proteins of muscle tissue; protein gels; protein denaturation; muscle protein transitions in denaturation; O-aggregation and gelation of myofibrillar proteins; and the order of aggregate reaction. JVS

- 3893 OCKERMAN (HW). Combined effects of electrical stimulation and methods of meat preservation upon the survival of bacteria. *J. Food Process. Preserv.* 8(1); 1984; 47-56

Electrical stimulation in all experiments reduced initial bacterial numbers and lowered tissue pH. Under the conditions of this research no synergistic effect could be proved for electrical stimulation and 3% salt or 3% salt and 200 ppm of nitrite or for storage at -21 C. However, a synergistic effect was observed for electrical stimulation and heating at 60 C. This reduction in thermoresistance caused by electrical stimulation did not appear to be caused by the lowering of pH of the heating media. AA

- 3894 ZUBILLAGA (MP), MAERKER (G) and FOGLIA (TA). Antioxidant activity of sodium nitrite in meat. *J. Am. Oil Chem. Soc.* 61(4); 1984; 772-6

The manner in which sodium nitrite inhibits oxidation in meat has been discussed. The polar lipids were extracted in raw as well as sodium nitrite treated beef and pork. The polar lipid fraction showed good activity in inhibiting linoleic acid oxidation. The antioxidant activity of polar lipids was stable for several months when they were stored in hexane at -20 C. JVS

- 3895 GREGER (JL), LEE (K), GRAHAM (KL), CHINN (BL) and LIEBERT (JC). Iron, zinc and copper metabolism of human subjects fed nitrite and erythorbate cured meats. *J. Agric. Food Chem.* 32(4); 1984; 861-5

Sausages cured with nitrite and erythorbate are typical of commercial

formulations. Adult men consuming meat cured with these 2 chemicals (at specific levels) for 51 days did not show significant differences on apparent absorption of iron, zinc or copper, serum zinc or copper levels, or plasma ferritin, transferrin and ceruloplasmin levels. JVS

- 3896 LEE (K), CHINN (BL), GREGER (JL), GRAHAM (KL), SHIMAOKA (JE) and LIEBERT (JC). Bioavailability of iron to rats from nitrite and erythorbate cured processed meats. *J. Agric. Food Chem.* 32(4); 1984; 856-60

Sausages cured with erythorbate (550 mcg/g) and nitrite (156 mcg/g) were tested for bioavailability of iron in rat feeding trials. Curing of meat with either of these chemicals did not show any significant effect on iron absorption or iron incorporation into tissues. JVS

- 3897 PARRIS (N). An improved fluorometric method for the determination of ammonia and volatile amines in meat tissue by high performance liquid chromatography. *J. Agric. Food Chem.* 32(4); 1984; 829-31

Ammonia and volatile amines are determined in meat tissue as fluorescent dansyl derivatives. Separations were carried out by reverse phase HPLC. JVS

- 3898 JONAS (DA) and WOOD (R). Determination of hydroxyproline in meat products: *J. Assoc. Publ. Anal.* 21(4); 1983; 113-21

A method for determination of the amino-acid hydroxyproline (which is used as a measure of collagen) in meat products has been collaboratively tested among 26 laboratories. It was found in this trial that the repeatability and reproducibility increase with increasing mean hydroxyproline content, and at a mean hydroxyproline content of 0.43%, the repeatability and reproducibility are 0.13 and 0.25%, respectively, whereas at a mean hydroxyproline content of 12%, these values are 0.62 and 1.26%, respectively. AA

- 3899 BACUS (J). Update: Meat fermentation 1984. *Food Technol.* 38(6); 1984; 59-63

Review. Discusses the control of fermentation involved in the manufacture of meat products, extensive use of commercial starter cultures, nitrosamine reduction - botulinum control, and need for precaution to reduce the risk of toxic histamine. JVS

- 3900 GASPAR (O), VAMOS (E) and GABOR (E). Quantitative determination of muscle protein in meat products by measuring creatine content. *Acta Aliment.* 13(1); 1984; 13-22

Spectrophotometric measurements on solutions of known creatine content gave a calibration curve (extinction vs μg creatin/25 cc) that was practically linear. It was also shown that the spectrophotometrically measured creatine content was proportional to the amount of muscle protein. Analytical data obtained from samples of Pariszi sausage showed that the meat protein can be calculated from creatine measurements. The creatine/protein conversion factor (11.08) introduced into the calculations limits the accuracy of the determination to 4% in terms of protein as total matter. The creatine calibration curve must be constructed in order to eliminate the error arising from the inaccuracy of the spectrophotometer. KMD

- 3901 HOWELL (NK) and LAWRIE (RA). Functional aspects of blood plasma proteins. II. Gelling properties. *J. Food Technol.* 19(3); 1984; 289-95

A method for studying the gelation of small quantities of plasma proteins in a cake-type model system was devised and was found to produce reproducible gels. The results indicated that considerable increases in the

strength of the gels of porcine and bovine plasma and porcine serum developed as time and temperature of heating were raised. These increases were much greater than those obtained for comparable egg albumen gels. Of the plasma proteins fractionated by ion exchange chromatography, fraction III (albumin) followed a similar pattern to that of whole plasma. However, the gels of all three fractions were weaker than those of whole plasma, indicating interaction between the different proteins in the latter. AA

- 3902 HOWELL (NK) and LAWRIE (RH). Functional aspects of blood plasma proteins. III. Interaction with other proteins and stabilizers. *J. Food Technol.* 19(3); 1984; 297-313

The proteins of whole blood plasma, serum and plasma fractions interacted with egg albumen proteins producing stronger gels than those of the plasma protein preparations in isolation. An index was devised to measure this interaction, which varied with time and temperature of heating and plasma protein concentration. Although whey proteins exhibited positive (i.e. increased gel strength) interaction with plasma proteins, the admixture of proteins of soya isolate or sodium caseinate, and the incorporation of selected stabilizers, resulted in very weak gels. AA

BEEF

- 3903 SWATLAND (HJ) and DUTSON (TR). Postmortem changes in some optical, electrical and biochemical properties of electrically stimulated beef carcasses. *Can. J. Anim. Sci.* 64(1); 1984; 45-51

- 3904 SAYEM-EL-DAHER (N), SIMARD (RE), FILLION (J) and ROBERGE (AG). Extraction and determination of biogenic amines in ground beef and their relation to microbial quality. *Food Sci.+Technol.* 17(1); 1984; 20-23

The purpose of the present study was to obtain more information on the presence of mono-, di-, and polyamines in ground beef and on their relation to meat freshness. Sixty-two samples of ground beef were randomly purchased from retail outlets and analyzed for fat, protein, moisture, total microbial count and eleven biogenic amines. The efficiency of amine extraction with 0.6 N perchloric acid was evaluated as a function of amine concentration. Amines were assayed by cation exchange chromatography. The following amines were identified in beef samples: adrenaline, noradrenaline, 1,3-diaminopropane, putrescine, histamine, cadaverine, spermidine, dopamine, agmatine, spermine and tyramine. The mean concentration of these amines ranged from 0.003 to 12 mg/100 g. Significant correlations were noted between putrescine, cadaverine, spermidine and total microbial count. These amines may serve as indicators of beef quality. AA

- 3905 NDUPUH (EC) and AKOBUNDU (ENT). Influence of vegetable protein mixture of sensory characteristics of beef patties. *J. Food Sci. Technol. (India)* 21(2); 1984; 108-10

Beef patties were prepared by replacing beef partly with mixtures of maize flour (MF), plus defatted groundnut flour (DGF), and maize protein concentrate (MPC) plus DGF at 10, 20 and 30% levels. The protein content of these vegetable mixture added beef patties ranged from 15.49 to 18.34% compared to 18.09% of ground beef. Beef patties containing vegetable mixture upto 20% had quality attributes comparable to control and were preferred by the sensory panel. Beef patties containing MPC and DGF were organoleptically superior to those containing MF and DGF. KAR

CATTLE

- 3906 THONNEY (ML), NOUR (AYM), STOUFFER (JE) and WHITE (WEC). Jr. Changes in primal cuts with increasing carcass weight in large and small cattle. *Can. J. Anim. Sci.* 64(1); 1984; 29-38

BULL

- 3907 JONES (SDM), ROMPALA (RE), WILTON (JW) and WATSON (CH). Empty body weights, carcass weights and offal proportions in bulls and steers of different mature size. *Can. J. Anim. Sci.* 64(1); 1984; 53-7

STEER

- 3908 HIRONAKA (R), SONNTAG (BH) and KOZUB (GC). The effect of feed restriction on feed efficiencies and carcasses of Charolais X Hereford steers. *Can. J. Anim. Sci.* 64(1); 1984; 59-66

EWE

- 3909 CHIQUETTE (J), MINVIELLE (F) and DUFOUR (JJ). Prepubertal plasma LH concentration, ovulation rate and prolificacy in Finn, Suffolk and Finn-Suffolk ewes. *Can. J. Anim. Sci.* 64(1); 1984; 67-72

PORK

- 3910 JEREMIAH (LE) and WEISS (GM). The effects of slaughter weight and sex on the cooking losses from the palatability attributes of pork loin chops. *Can. J. Anim. Sci.* 64(1); 1984; 39-43
- 3911 CLIPLEF (RL), GRINWICH (DL) and CASTELL (AG). Consumer acceptance of fresh pork and pork products from littermate boars and barrows. *Can. J. Anim. Sci.* 64(1); 1984; 21-7

PIG

- 3912 CASAS (C), TORMO (J), HERNANDEZ (PE) and SANZ (B). Detection and partial characterization of soluble pig muscle proteins by immunoelectrophoresis in agarose gels. *J. Food Technol.* 19(3); 1984; 283-7

SWINE

- 3913 WOLF (FJ), ALVARO (R), STEFFENS (JJ), WOLF (DE), KONIUSZY (FR), GREEN (ML) and JACOB (TA). Tissue residue due to ronidazole: Bioavailability of residues in swine muscle on ingestion by the rat. *J. Agric. Food Chem.* 32(4); 1984; 711-4

Ronidazole is used in controlling swine dysentery. It disappears rapidly from edible tissues of pig but labelled compound is known to persist

for extended periods. During the present study, a sizeable fraction of the residues in the serine meat dosed with methyl- ^{14}C ronidazole was absorbed and retained by rat. JVS

SAUSAGE

- 3914 MARIO (B). Incidence of microbial contamination in sausages during the various phases of processing. *Ind. Aliment.* 23(1); 1984; 9-12 (Italian)
Factors causing bacterial contamination in some types of sausages (boiled ham, bacon, and salami) at different stages of their processing are discussed. It is pointed out that, even today, the production systems are affected by a lack of hygiene. KMD

CHICKEN

- 3915 DAVISON (KL), LAMOUREUX (C-JH) and FEIL (VJ). Methoxychlor metabolism in chickens. *J. Agric. Food Chem.* 32(4); 1984; 900-908
(^{14}C)Methoxychlor (1,1,1-trichloro-2,2-bis(4-methoxyphenyl)ethane) was given orally to intact, colostomized, and bile-fistulated chickens. Dosages were 0.2, 10, and 100 mg of methoxychlor/day for periods of 1 and 14 days. Recovery of ^{14}C was greater in carcasses of hens compared to roosters for comparable dosages and time. ^{14}C in eggs varied with dose and time and predominantly in yolk. Methoxychlor and 26 metabolites were either identified or characterized; 22 metabolites in feces, 14 in urine, and 6 in bile. Metabolism included demethylation, ring hydroxylation, conjugation with glucuronic acid dechlorination, dehydrochlorination, and formation of substituted benzophenones. AA
- 3916 FARAG (RS), MOSTAFA (MAF), ABDELLA (AF) and MOSTAFA (MS). Feeding effect of some poultry byproducts on chicken's serum fatty acids. *Fette Seifen Anstrichm.* 86(1); 1984; 33-7

WHITE LEGHORN

- 3917 ABPLANALP (H), PETERSON (SJ), OKAMOTO (S) and NAPOLITANO (D). Heterosis, recombination effects and genetic variability of egg composition in inbred lines of white leghorns and their crosses. *Br. Poult. Sci.* 25(3); 1984; 361-7

DUCK

- 3918 KHANNA (N) and PANDA (PC). Effect of storage on the quality of duck sausage. *Indian J. Poult. Sci.* 19(3); 1984; 137-41
Duck sausage, prepared according to the method described earlier (this Journal vol. 18, p.65-69), could be stored for 7 days at $4 \pm 1^\circ\text{C}$, and for 15 days at -10°C , without any adverse effect on its organoleptic quality. At the end of the storage period, the products fell within the prescribed limits of microbial safety (total aerobes $\leq 140/\text{g}$ psychrotrophs $\leq 230/\text{g}$; coliforms $\leq 13/\text{g}$) with very little change in their composition. KMD

EGG

- 3919 CHARLES (DR). A model of egg production. *Br. Poult. Sci.* 25(3); 1984; 309-21
- 3920 GOSSETT (PW), RIZVI (SSH), and BAKER (RC). Quantitative analysis of gelation in egg protein systems. *Food Technol.* 38(5); 1984; 67-8,70,72-4,96
The article provides a quantitative analysis of heat induced coagulation or gelation of egg albumen proteins. Factors affecting the kinetic parameters of gelation, rheological properties of gel and methods used for measuring gelation have been discussed. JVS
- 3921 OSBORNE (BG) and BARRETT (GM). Compositional analysis of liquid egg products using infrared transmission spectroscopy. *J. Food Technol.* 19(3); 1984; 349-53
Calibration equations have been developed for the measurement of protein, total lipid and total solids content of liquid egg products using infrared transmission spectroscopy and the technique enables all these analyses to be carried out in under 20 minutes. Multiple correlation coefficients of 0.982, 0.988 and 0.997 and residual standard deviations of 0.37, 0.66 and 1.06% respectively were obtained for the infrared method compared with standard procedures. The results for total solids was not significantly different from that obtained by regression of total solids on combined protein and total lipid, all three determined by standard methods. AA

SEAFOODS

FISH

- 3922 UNNIKRISHNAN (TS), KALAIMANI (N), MURALEEDHARAN (V) and GEORGE JOSEPH (K). Removal of fungus and prevention of fungal reinfestation in stored dry salted fish. *Fish. Technol.* 20(2); 1983; 128
Commercial dry cured fish infested with fungus and red halophiles were washed and dried (i) as such or after (ii) treating with 5% brine for 5 minutes, (iii) dipping in saturated brine containing 1% sodium propionate for 5 minutes, (iv) smearing with a mixture of 3% sodium propionate in dry, refined salt in the ratio of 1 part of mixture to 10 parts of dry fish. Treatment (iv) retained the quality of fish for 6 months and (iii) for 5 months (i) and (ii) had a shelf life of 1 and 2 weeks respectively. KAR
- 3923 OBANU (ZA). Influence of muscle fats on the quality of intermediate moisture fish. *Fish. Technol.* 20(2); 1983; 69-74
Intermediate moisture (IM) products were prepared from *chrysichthys nigrodigitatus* with 12.95% fat (fatty fish) and *Citharinus citharus* with 3.25% fat (lean fish) content and compared with normal cooked samples immediately after preparation and during storage for 12 weeks at 30 C. Moisture contents after the cook - soak - equilibration (CSE) processing fell from 70.37 to 48.42% for fatty fish and from 79.53 to 51.70% for the lean fish. During storage, this trend was reversed as the IM lean fish pieces lost moisture more rapidly than the fatty fish, Ordinary cooked fish had pH of 6.72 for the fatty fish and 6.70 for the lean species while the IM products after CSE had a pH of 6.87 which remained constant during storage also. The fatty fish had higher thiobarbituric acid values than the lean fish soon

after CSE and early in storage but at the end of storage the differences tended to narrow down. The fatty fish was judged as 'slightly white' and fatty fish as moderately brown after 6 weeks of storage. The IM products of both fish types compared with normal cooked types were evaluated as of acceptable colour, odour, texture and juiciness but of inferior taste due to the glycerol impact. During storage, IM products became increasingly less acceptable with the deterioration being greater in the fatty fish than in lean fish, although IM fatty fish was superior to IM lean fish with regard to water retention and juiciness. Overall quality differences were most apparent in colour and odour with the fatty IM fish being worse. KAR

- 3924 TEENY (FM), GAUGLITZ (EJ) Jr., HALL (AS) and HOULE (CR). Mineral composition of the edible muscle tissue of seven species of fish from the Northeast Pacific. *J. Agric. Food Chem.* 32(4); 1984; 852-5

The edible muscle tissue of Pacific cod, Dover sole, Walleye Pollack, Pacific whiting, Pomfret, Atka mackerel and American sherd was analysed for 21 mineral content. JVS

- 3925 LAWRENCE (JF) and WEBER (DF). Determination of polycyclic aromatic hydrocarbons in some Canadian commercial fish, shellfish, and meat products by liquid chromatography with confirmation by capillary gas chromatography-mass spectrometry. *J. Agric. Food Chem.* 32(4); 1984; 789-94

A variety of Canadian food commodities consisting of seafoods and meats were screened for 18 polycyclic aromatic hydrocarbons (PAH) of which 11 are believed to be carcinogens. The PAH levels ranged from nil to a few hundred micrograms for kilogram (for example oil from a can of smoked oysters). Most samples contained very minute levels of PAH. JVS

- 3926 KEARSLEY (MW), EL-KHATIB (L) and GUNU (COKA). Rapid determination of total volatile nitrogen in fish and meat. *J. Assoc. Public Anal.* 21(4); 1983; 123-8

Analytical parameters such as distillation time, particle size of the sample, sample size and presence of magnesium oxide are investigated using the new method, and in each case the results are compared with those obtained from the standard Lucke and Geidel method. The study indicates that the results are comparable, and the many benefits of the new method may therefore be utilized without loss of accuracy of determination. AA

- 3927 MIYATA (Y). Concentration of protein from the wash water of red meat fish by ultrafiltration membrane. *Bull. Jpn. Soc. Sci. Fish.* 50(4); 1984, 659-63

- 3928 NIKI (H), KATO (T) and IGARASHI (S). Attempts to reduce viscosity of fish meal sol in producing active fish protein powder. *Bull. Jpn. Soc. Sci. Fish.*, 50(4); 1984; 689-94

The following methods were suggested to reduce the viscosity of fish meal sol in producing active fish protein powder. Adding calcium ions, adding water soluble proteins to fish meal sol and lowering the pH in fish meal sol are some of the methods suggested. KAR

- 3929 YAMANAKA (H), SHIOMI (K), KIKUCHI (T) and OKUZUMI (M). Changes in histamine contents in red meat fish during storage at different temperatures. *Bull. Jpn. Soc. Sci. Fish.* 50(4); 1984; 695-701

Changes in histamine contents during storage at 5 C, 20 C and 35 C were examined in the ordinary and dark meats of sardine, saury pike, mackerel,

yellowtail, skipjack, big-eye tuna and horse mackerel. During storage at 20 C histamine was produced and accumulated at the highest concentrations. In the meats of sardine, saury pike, mackerel and horse mackerel the amounts of histamine increased gradually during storage at 5 C. Histamine formation of dark meat was less than that of ordinary meat at the same storage temperature. During storage at 5 C or 20 C, large amounts of histamine were detected sometimes in the fresh meats of sardine, saury pike and mackerel whose volatile basic nitrogen contents were lower than 20 mg/100 g. The relation between histamine contents and numbers of histamine-forming bacteria was examined in the meat of mackerel during storage at 20 C. At the early stage of storage psychrophilic and halophilic histamine-forming bacteria were predominant, i.e., after 2 days of storage when 10^7 - 10^8 of the bacteria were measured, 440 mg/100 g of histamine was produced. With the lapse of time mesophilic and non-halophilic histamine-forming bacteria increased in numbers. AA

- 3930 OCHIAI (Y), WATABE (S), HASHIMOTO (K), NARITA (H), UKISHIMA (Y) and NARA (M). Biochemical identification of two gempylid fishes causative of a food poisoning. *Bull. Jpn. Soc. Sci. Fish.* 50(4); 1984; 721-5

The protein pattern is species specific enough to distinguish the two gempylid fishes from any of the other fishes tested. The pattern of either dehydrogenase was found to be less species specific. KAR

- 3931 TAKAI (R), WATANABE (H), MIZUSAWA (S) and HASEGAWA (H). Effect of ultrasonics applied to washing-out process of chopped fish meat. *Bull. Jpn. Soc. Sci. Fish.* 50(5); 1984; 907 (Japanese)

- 3932 AFOLABI (OA), ARAWOMO (OA) and OKE (OL). Quality changes of Nigerian traditionally processed freshwater fish species. I. Nutritive and organoleptic changes. *J. Food Technol.* 19(3); 1984; 333-40

Traditionally smoked (TS), traditionally solar dried (TD), oven dried (OD), Ife solar dried (ISD), and fresh (FF) *Clarias lazera*, *Sarotherodon niloticus*, *Sarotherodon galileus*, *Tilapia zillii*, and *Hemichromis fasciatus* were assessed for proximate composition, nutritive value and organoleptic changes. Proximate composition of the fish treatment groups were similar, and this increased with decreasing moisture content. Biological value (BV), true digestibility (TD), net protein utilization (NPU), protein efficiency ratio (PER) were greater than casein ($P < 0.01$) although they are not statistically different from each other. From consumer-type taste panel, no statistically significant differences between fish species and organoleptic attributes scores could be discerned. However, a comparison between fish treatment and organoleptic attributes showed obvious differences. The fresh fish always scored highest while TD scored the lowest. AA

- 3933 AFOLABI (OA), SALAU (AMA) and OKE (OL). Quality changes of Nigerian traditionally processed freshwater fish species. II. Chemical composition. *J. Food Technol.* 19(3); 1984; 341-8

chemical changes in traditionally smoked (TS), traditionally solar dried (TD), oven dried (OD), Ife solar dried (ISD), *Clarias lazera*, *Sarotherodon niloticus*, *Sarotherodon galilaeus*, *Tilapia zillii* and *Hemichromis fasciatus* were determined. Amino acid composition of fish treatment groups were similar. There was a decrease in percent available lysine in the order $OD \approx ISD > TS > TD$. No systematic variation in fatty acid composition was observed. Analysis of nucleotides and nucleotide related products revealed no systematic variation in the individual nucleotide content. However a pooled percent of the total nucleotides shows that TD has the highest value of hypoxanthine (HX). AA

- 3934 PARAB (SN) and RAO (SB). Distribution of trimethylamine oxide in some marine and freshwater fish. *Curr. Sci.* 53(6); 1984; 307-9

The amount of trimethylamine oxide (TMAO) in some species of Indian fish (elasmobranchs, teleosts and crustacea) was estimated using pictrate method. Results confirmed that TMAO varied widely among fish species on the size of fish, environment and possibly type and availability of nutrition. The variations in concentration observed in the same species of fish from different Indian coasts was attributed probably to differences in environments existing at different fishing grounds. Different methods of analysis had also some influence on the variations. However, the reference values presented in regard to TMAO were stated to be of possible use for predicting shelf life of fish catch. MVG

- 3935 GEORGE JOSEPH (K), MURALEEDHARAN (V) and UNNIKRISHNAN NAIR (TS). Quality of cured fishery products from Malabar and Kanara coasts. *Fish. Technol.* 20(2); 1983; 118-22

Dry cured fish (319 samples) of various species sold in markets of West Coast of India were collected and analysed for bacteriological and organoleptic qualities. 77.12% of samples had >35% moisture, 97.18% showed salt content < 25% and all samples had acid insoluble ash > 1.5%. 42.32% gave standard plate count of > 10^3 and 45.77% were contaminated with 'Red' halophiles. The total volatile N ranged from 32.26 to 140.9 mg/100 g. Samples prepared in the laboratory under controlled conditions showed a moisture range of 18.33-42.32%, salt content of 18.78-26.52%, acid insoluble ash of 1.23-2.21%, total volatile N of 42.00-93.76 mg/100 g and SPC of 1.308×10^2 - 8.547×10^3 . The major defects in commercial processing were imperfect cleaning, inadequate salting and unhygienic conditions of processing. KAR

- 3936 STATHAM (JA). Modified atmosphere storage of fisheries products: The state of the art. *Food Technol. Aust.* 36(5); 1984; 233-9

Aspects covered in this review include mechanism of bacterial inhibition by CO_2 , chemistry of CO_2 in flesh foods, chemical and physical effects of CO_2 on fish muscle, bacterial growth on fish stored in modified atmospheres; extension of shelflife resulting from MAS, effects of MAS on growth of pathogens, and application for MAS. KAR

SARDINE OIL

- 3937 ABE (Y) and TANAKA (M). Concentration of ethyl icosapentaenoate from Japanese sardine oil by molecular sieve column. *Fette Seifen Anstrichm.* 86(1); 1984; 8-10

TROUT

- 3938 REGENSTEIN (JM), JAUREGUI (CA) and BAKER (RC). The effect of pH, polyphosphates and different salts on water retention properties of ground trout muscle. *J. Food Biochem.* 8(2); 1984; 123-31

- 3939 OPSTVEDT (J), MILLER (R), HARDY (RW) and SPINELLI (J). Heat-induced changes in sulphhydryl groups and disulphide bonds in fish protein and their effect on protein and amino acid digestibility in rainbow trout (*Salmo gairdneri*). *J. Agric. Food Chem.* 32(4); 1984; 929-35

Ground fillets of a low fat (Alaska Pollack) and high fat (Pacific Mackerel) fish were heated from 40 to 115 C. The transformation of -54 groups

to -55 bonds appeared to occur after 50 C. Cysteine and cysteine were lost by heating at 115 C. Heating at 95 C reduced the protein and aminoacid availability to Rainbow Trout. Freeze-drying did not affect digestibility. JVS

EEL

- 3940 REHBEIN (H), Isolation of lysosomes from Eel muscle (*Anguilla* sp.). *J. Food Biochem.* 8(2); 1984; 79-89

MACKEREL

- 3941 TIECCO (G), TANTILLO (G), FRANCIOSO (E) and DE NATALE (G). Research on the presence of histamine and other polyamines in mackerels and sardines preserved at different temperatures. *Ind. Aliment.* 23(1); 1984; 1-8 (Italian)

Histamine in the muscles of mackerels and sardines has been estimated by HPLC. An attempt has been made to correlate bacterial content with the presence of histamine and other polyamines that cause food poisoning. Some histidine decarboxylase positive strains have been identified. It is concluded that fish which have not been kept at the specified preservation temperature, not only during the storage period but even during the period preceding their canning can exhibit a high content of histamines and other polyamines. KMD

- 3942 OKUZUMI (M), YAMANAKA (H), KUBOZUKA (T), OZAKI (H) and MATSUBARA (K). Changes in numbers of histamine-forming bacteria on/in common mackerel stored at various temperatures. *Bull. Jpn. Soc. Sci. Fish.* 50(4); 1984; 653-7

In mackerel stored at 5 and 10 C, main histamine formers were only N-group bacteria. In samples stored at 15 C, the formation of histamine might be attributed to the N-group bacteria although *P. morgani* increased during the storage. As for the samples stored at 20 C a great part of the histamine at the early stage of storage might be accumulated by the N-group bacteria and at the later stages by *P. morgani*. In both cases of the samples stored at 25 C and 30 C, the accumulation of histamine was due to the action of *P. morgani* to a great extent. KAR

- 3943 FUKUDA (Y), TARAKITA (Z) and ARAI (K-I). Effect of freshness of chub mackerel on the freeze-denaturation of myofibrillar protein. *Bull. Jpn. Soc. Sci. Fish.* 50(5); 1984; 845-52

When the chub mackerel *Scomber japonicus* was kept in ice water, a decline in freshness proceeded accompanying the changes in toughness, pH and K value of muscle. In most specimens, full rigor occurred between 2-28 hours after death, and the resolution of rigor mortis around 20 hours after death or later. It was observed that there was much more marked denaturation in the muscle when frozen during post rigor than frozen during pre-rigor. KAR

TILAPIA

- 3944 JAYANTHA RAO (K), AZHAR BAIG (MD) and RAMAMURTHY (K). Effect of a systemic pesticide phosphamidon on some aspects of fresh water fish, *Tilapia mossambica*. *Indian J. Environ. Health.* 26(1); 1984; 60-64

SNAIL

- 3945 FENOLLA (J), SAMPELAYO (RS), PRIETO (C) and GIL EXTREMERA (F). Protein evaluation of a snail meal (*Helix aspersa*). *Anal. Bromatol.* 35(1); 1983; 21-9. (Spanish)

With the object of evaluation the quality of the snail protein and providing new data for tables of food composition, some experiments have been performed in rats. Two experimental diets based on a snail meal and a veal meal, respectively, were tested. Minor differences in protein quality of the two diets were demonstrated. AA

MUSSEL

- 3946 UNNIKRISHNAN NAIR (TS), MURALEEDHARAN (V) and GEORGE JOSEPH (K). Preparation of mussel meat by drying. *Fish. Technol.* 20(2); 1983; 115-7

Shucked mussel meat was blanched in 5% boiling brine for 5 minutes and dried to 10-15% moisture and packed in glass bottles as well as in polyethene bags and stored for 8 months. The product stored in both the types of package had a storage life of 6 months, after which the organoleptic qualities deteriorated. Total plate count after 6 months of storage was 2.231×10^3 and the major type of spoilage after this is brown discolouration.

OYSTER

- 3947 DURAIRAJ (S), CHINNASWAMY (G) and SYED MOHAMED. A bacteriological study of the natural flora of edible oyster, *Crassostrea madrasensis*. *Fish. Technol.* 20(2); 1983; 111-4

The total viable bacterial count in the edible oyster (*Crassostrea madrasensis*) and the sea water collected from the oyster Farm at Tuticorn (India) were $10^3 - 10^4$ /ml and $10^2 - 10^3$ /ml respectively. The maximum most probable number of faecal coliform recorded during the one year period of study of both the oysters and seawater were 33 per 100 ml. Pathogenic bacteria (*Salmonella* sp. *Vibrio cholerae*, coagulase positive staphylococci and faecal streptococci) were absent in oysters and farm water. Study of 197 (98 taken from oyster liquid and 99 from oyster farm water) randomly isolated cultures indicated that gram negative asporogenous rod-like bacteria of the *Vibrio*, *Flavobacterium*, *Achromobacter* and *Pseudomonas* groups were the dominant flora of the oyster liquid as well as seawater. AA

PROTEIN FOODS

- 3948 SEFA-DEDEH (S). An old processing method. A new protein food. *Food Nutr. Bull.* 6(1); 1984; 77-80

BABY FOOD

- 3949 CARBALLIDO (A) and BARRAGAN RUIZ (MaR). Contribution to the bromatological study of baby foods. 5. Content of free sugars and starches. *Anal. Bromatol.* 35(1); 1983; 111-22 (Spanish)

The Southgate method, as modified by Fidanza, has been used to determine the available carbohydrates - i.e. free sugars and starch - in twenty-four

samples of baby foods, including vegetables and meat products, and desserts and sweets. The values for total available carbohydrates ranged between 3.19 and 30.55 g/100 g. KMD

- 3950 BOSCH BOSCH (N) and GARCIA MATA (M). Nitrates and nitrites contents in prepared baby foods. *Anal. Bromatol.* 35(1); 1983; 151-6 (Spanish)

Nitrates and nitrites contents in prepared baby foods on sale at Chemist's have been determined by spectrophotometry. The obtained data are expressed in ppm. AA

FRUIT JUICES AND BEVERAGES

- 3951 MARTINEZ PARA (MDC), MASOUD (TA) and AGUILAR VILAS (MV). Iron-manganese relation in refreshing beverages. *Anal. Bromatol.* 35(1); 1983; 41-50

FRUIT JUICES

- 3952 THONGES (H) and RINDER (H). Raw materials for the fruit juice industry. *Confructa.* 28(1); 1984; 8-54

This compilation contains information on: (1) botany, biology, and plant growing of fruit plants in general; (2) quality characteristics of the harvested raw material; (3) chemical components found in fruits and their technological importance; and (4) short descriptions of 55 different fruits. The text is in both German and English. KMD

- 3953 CARTWRIGHT (P) and HOCKING (AD). *Byssochlamys* in fruit juices. *Food Technol. Aust.* 36(5); 1984; 210-11

A heat resistant mould identified as *Byssochlamys fulva* was found in Tetra Brik-packaged fruit juice. Because of the nature of the heat process it was not possible to apply sufficient heat treatment to kill the spores, as D values up to 12 minutes at 90 C and Z values as high as 7.8 C have been reported. Incidence of failure of packed product was reduced by use of a heat-resistant mould test and application of a stringent specification with respect to *Byssochlamys* species. This specification requires that *Byssochlamys* spores be absent from a 100 mL sample from each 200 L drum of juice. AA

BLACK CURRANT JUICE

- 3954 BIELIG (H-J), FAETHE (W), FUCHS (G), KOCH (J), WALLRAUCH (S) and WUCHERPFEN-NIG (K). Guide values and range of variation of certain RSK-values for black currant juice. *Confructa.* 28(1); 1984; 80-82 (German)

RASPBERRY JUICE

- 3955 Working Group on "Fruit Products and Fruit Juices". Guide values and range of variation of certain RSK-values for raspberry juice. *Confructa.* 28(1); 1984; 76-7 (German)

GRAPE JUICE

- 3956 NOZAL NALDA (MJD), BERNAL YAGUE (JL) and PEDRERO MARTIN (MM). Spectrophotometric and potentiometric determination of mineral components in unfermented grape juice. *Anal. Bromatol.* 35(1); 1983; 51-65 (Spanish)

Different methods for determination of mineral components in unfermented grape juice are proposed. Phosphate ion can be determined both through UV. Visible or atomic absorption spectrophotometry; both techniques are applied after phosphomolybdate formation. Nitrate and halogen ions are determined with the correspondent selective electrodes. For Fe, Cu, Mn, Zn, Pb, Ca and Mg atomic absorption is used, while Na and K are determined by flame atomic emission. The methods here presented were successfully proved on three grape varieties. AA

- 3957 BRAVO ABAD (F) and REDONDO CUENCA (A). Comparative study of *Saccharomyces cerevisiae* var. *ellipsoideus* and a *Zygosaccharomyces* sp. in grape juice fermentation. *Anal. Bromatol.* 35(1); 1983; 105-110

Pure cultures of a diploid strain of *Saccharomyces cerevisiae* var. *ellipsoideus*, and a haploid strain *Zygosaccharomyces* behaved like initiators of alcoholic fermentation, depending on the redox potential of the grape must. The influence of the redox potential on the growth and activity of the yeasts, as well as on the wines obtained finally, has been studied. KMD

GRAPEFRUIT JUICE

- 3958 BIELIG (H-J), FAETHE (W), FUCHS (G), KOCH (J), WALLRAUCH (S) and WUCHERPFENNIG (K). Guide values and range of variation of certain RSK-values for grapefruit juice. *Confructa.* 28(1); 1984; 78-80 (German)

ORANGE JUICE

- 3959 KOCH (J). RSK-values for fruit juices. *Confructa.* 28(1); 1984; 55-62

75 pure, commercial orange juices have been analyzed and standard values and ranges for several parameters have been reported. These values are helpful in the detection of fraudulent manipulations of fruit juices. The text contains detailed explanations of the various parameters used in Germany. KMD

- 3960 SHAW (PE), TATUM (JH), and WILSON (CW) III. Improved flavour of navel orange and grapefruit juices by removal of bitter components with β -cyclodextrin polymer. *J. Agric. Food Chem.* 32(4); 1984; 832-6

β -cyclodextrin polymer used at a level of 1 g/50 ml of juice in a continuous flow fluid-bed or batch process lowered the bitterness of Navel orange juice; the major bitter components limonin, nomilin and naringin in grapefruit juice and limonin and nomilin in Navel orange juice were reduced by 50%. JVS

APPLE JUICE

- 3961 BIELIG (H-J), FAETHE (W), KOCH (J), WALLRAUCH (S) and WUCHERPFENNIG (K). Guide values and range of variation of certain RSK-values for apple juice, grape juice, and orange juice. *Confructa.* 28(1); 1984; 63-73 (German)

PEAR JUICE

- 3962 Working Group on "Fruit Products and Fruit Juices". Guide values and range of variation of certain RSK-values for pear juice. *Confructa*. 28(1); 1984; 74-6 (German)

COCOA

- 3963 JEE (MH). Composition of the fat extracted from the seeds of *Theobroma bicolor*. *J. Am. Oil Chem. Soc.* 61(4); 1984; 751-53

Theobroma bicolor is a plant species like cocoa but it is not cultivated. Its seeds contain about 38% of a soft yellow fat with 0.6% of an unsaponifiable matter. This fat is believed to be mixed with that of cocoa. In the present study, the fat of *Th. bicolor* was analysed for glycerides by TLC. The fatty acids and triglyceride composition were determined by GLC. The distribution of fatty acids in individual glycerides of different degrees of unsaturation separated by silver nitrate TLC were studied. The fat of *Th. bicolor* contained only 44% symmetrical monounsaturated triglycerides and high levels of diunsaturated triglycerides which explains its softness and low melting point. JVS

COFFEE

- 3964 LIARDON (R) and OTT (U). Application of multivariate statistics for the classification of coffee headspace profiles. *Food Sci. + Technol.* 17(1); 1984; 32-8

- 3965 SUZUKI (T) and WALLER (GR). Biosynthesis and biodegradation of caffeine, theobromine, and theophylline in *Coffea arabica* L. fruits. *J. Agric. Food Chem.* 32(4); 1984; 845-8

The biosynthesis and biodegradation of the purine alkaloids in developing *Coffea arabica* fruits were studied with (2-¹⁴C) caffeine, (8-¹⁴C) theophylline, (8-¹⁴C) adenine, (8-¹⁴C) guanine, (2-¹⁴C) xanthine, or L-(methyl-¹⁴C) methionine dissolved in water. Both immature and mature coffee fruits degraded (2-¹⁴C) caffeine to theobromine, theophylline, N³-methylxanthine, N⁷-methylxanthine, allantoin, allantoic acid, and urea. Immature fruit metabolized (8-¹⁴C) theophylline and (2-¹⁴C) xanthine more rapidly than the mature fruit. (8-¹⁴C) Adenine was more effective than (8-¹⁴C) guanine or L-(methyl-¹⁴C) methionine as a precursor for the biosynthesis of N⁷-methylxanthine, theobromine, and caffeine. These results indicate that (a) biosynthesis of caffeine occurs mainly during the green stage of fruit development through methylation of N⁷-methylxanthine and theobromine and (b) biodegradation occurs through theophylline, which accumulates after the seed is full size and proceeds to ripen. AA

- 3966 COUPER-SMARTT (J) and COUPER-SMARTT (I). Caffeine consumption: A review of its use, intake, clinical effects and hazards. *Food Technol. Aust.* 36(3); 1984; 131-4

History and background of caffeine beverage use with a review of some of its reported and its verified physiological and pathological effects. AA

TEA

The volatiles of aqueous infusions of two black tea qualities (Indian Broken; Darjeeling Orange Pekoe) were investigated. Aroma separation was carried out by standard controlled high-vacuum distillation followed by solvent extraction (pentane-dichloromethane, 2:1). The concentrated extracts were prefractionated in four fractions by adsorption chromatography on silica gel using a pentane diethyl ether gradient. In total, 133 volatiles not described as yet as black tea aroma constituents were identified by capillary gas chromatography and coupled capillary gas chromatography-mass spectrometry, among them 11 hydrocarbon 30 esters, 25 alcohols, 48 carbonyls, 3 lactones, 3 phenols, and 13 volatiles of miscellaneous structures. These compounds are discussed from the aspect of their formation during black tea manufacturing. AA

WINE

- 3968 CREUS (JM), LOPEZ (J) and POVEDA (T). Determination of malvina in wines for fluorimetry and second derivative spectrophotometry. *Anal. Bromatol.* 35(1); 1983; 9-20 (Spanish)
- 3969 FALCON FLORIDO (JT), FERNANDEZ (MC), GOLAN GONZALEZ (JM), HARDISSON De La TORRE (A) and WILDPRET DIXKES (LM). Determination of metallic ions, (sodium, potassium, calcium, magnesium, iron and zinc) in the wines of the island of Tenerife by flame photometry and atomic absorptive spectroscopy. *Anal. Bromatol.* 35(1); 1983; 31-40 (Spanish)
- 3970 HERESZTYN (T). Methyl and ethyl amino acid esters in wine. *J. Agric. Food Chem.* 32(4); 1984; 916-8
During the present study, 13 amino acid esters were identified by GC-MS in ten wines and later quantified. The occurrence of methyl and ethyl esters of aminoacids in wines has been reported for the first time. JVS
- 3971 POSTEL (W) and ADAM (L). Higher esters in wine, distilling-wine and wine distillates. *Dtsch. Lebensmittel-Rundschau.* 80(1); 1984; 1-5 (German)
In wines, fortified wines (for distillation purposes), wine distillates and brandies ethyl and methyl esters of the higher fatty acids were determined by capillary gas chromatography. The amounts of ethyl esters of the even numbered fatty acids present vary within a wide range depending on different raw materials and technology applied, the methyl esters are present in very small amounts only, generally less than 0.05 mg/100 ml ethanol. The genuine contents of ethyl heptoate and ethyl nonanoate are generally markedly less than 0.1 mg/100 ml ethanol. AA
- 3972 DIEZ (C), GOMEZ-CORDOVES (C), HERNANDEZ (T) and SANTA MARIA (G). The importance of phenolic compounds of low molecular weight in investigating origins of wine. *Dtsch. Lebensmittel-Rundschau.* 80(1); 1984; 13-7 (German)

BEER

- 3973 WEBER (O). Approximative computation of the stock wort of dietetic beers of reduced alcohol content. *Dtsch. Lebensmittel-Rundschau.* 80(1); 1984; 18-20

SHERRY

- 3974 HIDALGO De CISNEROS (JLH), PASTOR SANCHEZ (MD) and PEREZ-BUSTAMANTE (JA). Determination of fluoride in sherry-type wines. *Anal. Bromatol.* 35(1); 1983; 67-77 (Spanish)

OILS AND FATS

OILS

- 3975 RAUTENBACH (R), SCHOCK (G) and PAUL (H). Processing of oil-containing industrial effluents by microfiltration/ultrafiltration. *Fette Seifen Anstreichm.* 86(1); 1984; 18-23 (German)
- The washing and rinsing procedures employed in the metal processing industry give rise to effluents from which pigment, oil, and dirt have to be removed before the effluent can be released into the sewage system. Such effluents are commonly subjected to an ultrafiltration; the permeate from the ultrafiltration can then be recycled with advantage as it still contains some detergents. The recycling also helps to reduce charges that can be levied under the sewerage Act. Since a higher oil content can be tolerated in the recycled permeate, it is advantageous to employ a microfiltration which will result in a higher flux through the filter membranes and a higher recovery of detergents. A combination of microfiltration and ultrafiltration can ensure a detergent recovery as high as 85%, and reduce costs by as much as 52%, when compared to a procedure depending solely on ultra-filtration. KMD
- 3976 USUKI (R), SUZUKI (T), ENDO (Y) and KANEDA (T). Residual amounts of chlorophylls and pheophytins in refined edible oils. *J. Am. Oil Chem. Soc.* 61(4); 1984; 785-8
- The presence of chlorophyll and pheophytin in commercial edible oils has been indicated after the analysis of chlorophylls A and B, and pheophytin A and B in refined oils. The ratio of chlorophyll and pheophytin was similar in different oils. In the case of soyabean oil, the increase in peroxide value was proportional to total chlorophyll content. JVS
- 3977 STAHL (E), QUIRIN (KW) and BLAGROVE (RJ). Extraction of seed oils with supercritical carbon dioxide: Effect of residual proteins. *J. Agric. Food Chem.* 32(4); 1984; 938-40
- Supercritical extraction of vegetable oils from meals at relatively low temperatures did not show any significant differences in amino acid content as compared to hexane extraction. The degradation of lupin seed globulins by trypsin was not enhanced by treatment with CO₂. JVS
- 3978 OIL TECHNOLOGISTS ASSOCIATION OF INDIA. 'Symposium on vegetable oils - new perspectives'. *J. Oil Technol. Assoc. India* 16(1); 1984; 1-45
- Apart from three papers which are abstracted separately, the following papers and abstracts are published in this issue. Papers: (1) SINHA (SK) - Prospects in development of oleochemicals in India, p.28-30; (2) CHAKRABORTY (MM) - Interaction between research and industry - A panel discussion, p.31-32; (3) TEWARI (GN) - Newer oils for surface coatings, p.33-35; (4) NAMBU DIRY (MEN) - Raw material outlook for soaps and synthetic surfactants, p.36-40. Abstracts: (relating to use of vegetable as food). (1) SHITOLE (AD) and BALIGA (BP) - Fractionation of rice bran oil.

zation, p. 41; (2) BHATTACHARYYA (DK), BISHNU (RN) and BHATTACHARYYA (AC) Vanaspati from high FFA rice bran oil, p.41; (3) SHAH (RK) and GUPTA (SV) Processing of rice bran oil, p.41; (4) KRISHNA REDDY (N), AZEEMODDIN (G), ATCHYUTA RAMAYYA (D) and THIRUMALA RAO (SD) - Laboratory preparation of low-fat, high-protein copra gratings, p.42; (5) JAYACHANDRA (K), AZEEMODDIN (G) and THIRUMALA RAO (SD) - Production of low acid oil from high acid rice bran oil, p.42; (6) NARASIMHACHAR (BL), JAGANMOHAN RAO (S), AZEEMODDIN (G) and THIRUMALA RAO (SD) - Analysis of new varieties of groundnuts grown in Junagadh, p.43; (7) LAKSHMINARAYANA (T), AZEEMODDIN (G), ATCHYUTA RAMAYYA (D) and THIRUMALA RAO (SD) - Decolourization and of brown coconut oil, p.43; (8) PANDEY (SN) and THEJAPPA (N) - Seed analysis of fatty acid composition of 'Kapok' seeds, p.44; (9) NAGARAJA (G) and MISRA (DP) - Some quantitative and qualitative aspects of groundnut oil production, p.44 and (10) NENE (SB) and VENKATESAN (TK) - Separation of fatty acids, p.44. KMD

- 3979 KUNDU (MK). Some non-conventional oils - current status and possible area of development. *J. Oil Technol. Assoc. India* . 16(1); 1984; 18-20

The author has drawn attention to some possibilities of producing stable soyabean oil, soya dal, and textured soya proteins in India; making better use of rice bran oil, sal seeds, and mahua fat. KMD

CANOLA OIL

- 3980 MAG (TK). Canola oil processing in Canada. *J. Oil Technol. Assoc. India* . 16(1); 1984; 21-7

The processing of Canola oil - i.e. rapeseed oil of low erucic acid and low glucosinolate content - is, in its essential conventional. It presents a few problems not encountered with other oils: e.g its chlorophyll content which calls for extra processing and analytical effort and certain limitations in crystallization behaviour when highly hydrogenated. Some of the advantages of canola oil are, that stable oils can be produced at a moderate degree of hydrogenation, and salad oil can be produced without hydrogenation. New developments have led to the production of an acid-degummed, crude oil on a commercial scale. This opens up the possibility of applying physical refining to the oil. KMD

CLOVE OIL

- 3981 GOPALAKRISHNAN (M), NARAYANAN (CS) and MATHEW (AG). Sesquiterpene hydrocarbons from clove oil. *Food Sci. + Technol.* 17(1); 1984; 42-3

GC/MS analysis of the hydrocarbon fraction of clove oil indicated mostly the presence of sesquiterpenes. Four of these namely α -cubebene, α -copaene, γ and δ -cadinenes are reported for the first time. AA

COCONUT OIL

- 3982 LAKSHMINARAYANA (T), AZEEMODDIN (G), ATCHYUTA RAMAYYA (D) and THIRUMALA RAO (SD). Direct bleaching of brown coconut oil. *Indian Coconut J.* 15(6); 1984; 15-6

Brown coconut oil, a product from inferior grade copra was bleached to light yellow colour by pretreatment with hydrogen peroxide or oxalic acid followed by bleaching with earth and carbon. AA

LUPIN OIL

- 3983 HUDSON (BJF), FLEETWOOD (JG) and LEWIS (JI). Oil content, fatty acids and unsaponifiable lipids of lupin seed. *J. Plant Food.* 5(1); 1983; 15-21

MANGO KERNEL OIL

- 3984 RUKMINI (C), and VIJAYARAGHAVAN (M). Nutritional and toxicological evaluation of mango kernel oil. *J. Am. Oil Chem. Soc.* 61(4); 1984; 789-92

Mango-kernel fat is a solid fat at room temperature and has a melting point of about 35 C. It is rich in equal amounts of stearic and oleic acids (42%). Rats were fed with either mango-kernel fat or groundnut oil (GNO) at a 10% level in a 20% protein diet that was adequate in vitamins and minerals. The feed-efficiency ratio and growth rate of rats fed mango-kernel fat were comparable with the control group. Studies of calcium, phosphorus and nitrogen balance showed that the retention of these nutrients was not adversely affected by the mango-fat intake. The apparent digestibility of mango fat was comparable with GNO when fed to rats. Toxicological evaluation of the fat showed a comparable reproductive performance with the GNO-fed animals. Liver serum, total cholesterol, triglycerides and total lipids were found to be within normal levels. The organ weights of the various tissues of the animals of both groups in the last generation were comparable. Histopathological studies of various organs revealed no abnormalities. These studies indicate that mango-kernel fat can substitute for any solid fat without adverse effect. AA

PALM OIL

- 3985 COHEN (D), YANNAI (S) and MOKADY (S). Toxicological evaluation of a liquid fraction derived from palm oil. *Arch. Toxicol. Suppl.* 6; 1983; 182-5

SOYABEAN OIL

- 3986 GHAVAMI (M) and MORTON (ID). Effect of heating at deep-fat frying temperature on the sterol content of soyabean oil. *J. Sci. Food Agric.* 35(5); 1984; 569-72

Preliminary studies by gas chromatography of phytosterols naturally present and added to soyabean oil, indicated that large quantities of these sterols were lost when soyabean oil was exposed to high temperature for a long period. The products which might have been produced as the result of sterol oxidation were not found as members of the nonsaponifiable fraction when this fraction was examined by thin layer and gas chromatography. AA

SUNFLOWER OIL

- 3987 ROBERTSON (JA), CHAPMAN (GW) and WILSON (RL) Jr. Effect of moisture content of oil type sunflower seed on fungal growth and seed quality during storage. *J. Am. Oil Chem. Soc.* 61(4); 1984; 768-71

Sunflower seeds exposed to R.H. of 65%, 84% and 93% at 10 C attained equilibrium moisture contents (m.c.) of 7.5%, 10.1% and 13.4% respectively. Germinability was least affected at 7.5% mc and to a progressively greater degree at 10.1% and 13.4% mc. The same trend was noticed in FFA development

also. At 10.1% mc, FFA development was correlated with *Aspergillus* and at 13.4% mc, with *Penicillium* and *Aspergillus*. Invasion of surface sterilised seeds by fungi at 7.4% was minimal. The pattern and stages of invasion by storage fungi at different mc are discussed. JVS

VERNONIA VOLKAMERIAEFOLIA OIL

- 3988 SIDDIQI (SF), AHMAD (F), SIDDIQI (MS), OSMAN (SM) and FENWICK (GR). *Vernonia volkameriaefolia* seed oil: A rich source of epoxy acid. *J. Am. Oil Chem. Soc.* 61(4); 1984; 798-800

The seed of *Vernonia volkameriaefolia* contain 20% oil and are a good source of epoxidized triglycerides. The vernolic acid (*cis*-12, 13-epoxy-*cis*-9,10-octadecenoic acid) content of the oil was 63.5%. The structure of this compound was established by chemical and physical methods, including a study of the mass spectral fragmentation of the parent compound and its derivatives. AA

FATS

- 3989 GANDER (K-F). Fat supply for humans from the economic and technological point of view. *Fette Seifen Anstrichm.* 86(1); 1984; 1-8 (German)

The author has presented a historical review of the availability of fat for human consumption over the last century. The period has been characterized by an enormous increase in the production and consumption of vegetable fats and oils, and the development of a modern refining and processing technology which has made a very wide variety of edible fats available to the consumer. KMD

- 3990 ASIF (M), SIDDIQI (MTA) and AHMAD (MU). Fatty acid and sugar composition of *Acorus calamus* Linn. *Fette Seifen Anstrichm.* 86(1); 1984; 24-5

- 3991 STEVERINK (ATG). Gas-chromatographic method for the determination of volatile fatty acids (C_1 - C_7) and lactic acid. *Analyst.* 109(2); 1984; 179-80

- 3992 AHMED (SM), AHMAD (MS) Jr., AHMAD (F) and OSMAN (SM). Oxymercuration - demercuration of hydroxy acetylenic acids. *J. Am. Oil Chem. Soc.* 61(4); 1984; 754-6

- 3993 HELDAL (JA) and FRANKEL (EN). Comparison of homogeneous and heterogeneous Palladium hydrogenation catalysts. *J. Am. Oil Chem. Soc.* 61(4); 1984; 756-61

Hydrogenation of methyl sorbate, methyl linoleate, and conjugated methyl linoleate was carried out by using different Palladium complexes as catalysts. The outcome of hydrogenation have been compared with hydrogenations using a heterogeneous PD/C catalyst. JVS

- 3994 SINGLETON (JA) and PATTEE (HW). Optimization of parameters for the analysis of triglyceride by reverse phase HPLC using a UV detector at 210 nm. *J. Am. Oil Chem. Soc.* 61(4); 1984; 761-6

The degree of interaction of solute molecules with mobile phase and hydrocarbon ligand was found to be influenced by the organic solvent used for dissolving the triglycerides. Triglycerides dissolved by chloroform showed better resolution. In the mobile phase, ethanol proved to be a better polar organic modifier than methanol. Analysis time was reduced by ballis-

- 3995 AGRAWAL (VP) and BLAGROVE (RJ). A novel method for spectrophotometric determination of triglycerides. *J. Am. Oil Chem. Soc.* 61(4); 1984; 766-8

A new method for the spectrophotometric determination of triglycerides at microgram levels has been developed. The method relies on the quantitative degradation of O-acyl lipids with hydrazine and the subsequent conversion of the fatty acid hydrazides to the corresponding N-isopropylidenealkanohydrazides by reaction with acetone. Results are presented for triolein and some oils of plant origin. AA

- 3996 HOQ (MM), YAMANE (T), SHIMIZU (S), FUNADA (T) and ISHIDA (S). Continuous synthesis of glycerides by lipase in a microporous membrane bioreactor. *J. Am. Oil Chem. Soc.* 61(4); 1984; 776-81

The applications of lipase as a successful biocatalyst in glyceride synthesis poses problems by way of the need for a surfactant to enable emulsification of oil, high power input, complications in the separations of emulsified oily products, difficulties in continuous operation of reaction system, continuous replenishment of lipase to the bioreactor and difficulties in controlling the water content of the reaction system. A bioreactor with a hydrophobic microporous system has been developed for the continuous production of glycerides by lipase. The system could be operated continuously for one month with 70% conversion when 1% CaCl_2 was added in glycerol solution. The glycerides obtained from the reactor contained equimolecular quantities of mono and diglycerides. Glycerol and polyglycerol esters of fatty acids are used as food flavours, and emulsifiers besides other applications. JVS

- 3997 ENDO (Y), USUKI (R) and KANEDA (T). Prooxidant activities of chlorophylls and their decomposition products on the photooxidation of methyl linoleate. *J. Am. Oil Chem. Soc.* 61(4); 1984; 781-4

Several publications in recent years have suggested the prooxidant activities of chlorophyll in fats and oil. In the present study the photooxidation at 0°C has been followed by adding the chlorophyll and its derivatives, chlorophyll B showed twice the prooxidant activity of chlorophyll A. Pheophytin and pheophorbide showed stronger prooxidant activities than chlorophyll. Photosensitive activity was manifested in pheophytin as well as chlorophyll. JVS

- 3998 CHUNG (OK), POMERANZ (Y) and JACOBS (RM). Solvent solubility parameter and flour moisture effects on lipid extractability. *J. Am. Oil Chem. Soc.* 61(4); 1984; 793-7

The total lipids extracted from flour (1.2%, 7.2% or 13.8% moisture contents) were fractionated. No specific binding was indicated in the present study between flour proteins and a specific polar lipid (PL) class. Among the PL, the digalactosyldiglyceride (DGDG) showed a clear-cut breaking point in irreversible restoration of breadmaking characteristics. The present study shows the role of phospholipids in bread production particularly from the contribution of DGDG. JVS

- 3999 ASERIN (A), FRENKEL (M) and GARTI (N). HPLC analysis of nonionic surfactants. Part IV. Polyoxyethylene fatty alcohols. *J. Am. Oil Chem. Soc.* 61(4); 1984; 805-9

A high performance liquid chromatographic technique using a Lichrosorb SI-60 column has been described for separating both oleyl and dibromostearyl alcohols ethoxylated with 1-30 EO units. The adducts showed good separation without any prechemical treatment. JVS

SPICES AND CONDIMENTS

- 4000 LOLATELLI (DP) and LOVINO (R). Detection and identification of the arthropods present in spices and aromatic herbs by using the technique of the filth test. *Ind. Aliment.* 23(1); 1984; 23-7 (Italian)

A total of 88 samples of ground and whole spices were examined under the stereo-microscope and analyzed by the filth test technique. The animals infesting these samples could be divided into two classes: (a) arthropods living on plants, and (b) insects and mites which typically infest products during their storage and marketing. Total filth reached high values in the spices and herbs that were examined; only 3% of the samples did not contain arthropods, or parts of arthropods. KMD

- 4001 NAMIKI (K), YAMANAKA (M), OSAWA (T) and NAMIKI (M). Mutagen formation by nitrite-spice reactions. *J. Agric. Food Chem.* 32(4); 1984; 948-52

Among several spices treated with sodium nitrite, pepper exhibited the strongest mutagenic activity for Ames method and nutmeg, chilli pepper, and laurel the strong activity. No mutagenicity was observed for spices alone. The mutagen production was observed between pH 2 and pH 6, with the maximum between pH 3 and pH 3.5, and the reaction was very fast at 40 C or above, even at the low levels of nitrite permitted by legal regulations. The mutagenicities of spice-nitrite reaction products were completely inactivated by S9 mix, but the activity of pepper-nitrite products toward TA 100 remained unchanged. By preparative TLC of spice-nitrite reaction mixtures, pepper provided two very active fractions, while nutmeg and chili pepper showed a different active fraction. AA

GARLIC

- 4002 DABABNEH (BFA) and AL-DELAIFY (KS). Inhibition of *Staphylococcus aureus* by garlic extract. *Food Sci.+Technol.* 17(1); 1984; 29-31

Water extract of garlic (*Allium sativum*, L.) was prepared from 1:1 (w/v) of fresh garlic bulbs to sterilized distilled water, 1% extract inhibited up to 119 viable cells of *Staphylococcus aureus*, 81. Extracts stored for 3 weeks at 4 C were more inhibitory to *S. aureus* growth than extracts at 20 C or 32 C. Exposing the extracts to heat treatment of 80 C for a heating time of 4 minutes completely destroyed the antibacterial action of the extract. If garlic was extracted with water adjusted to different pH levels, the highest antibacterial activity was found when bulks were extracted with water of pH 5.9 and the lowest activity when extracted at pH 10.0. Extracts from the green leaves or coleoptiles of garlic, exhibited lower inhibitory action to *S. aureus* than extracts from the bulbs. AA

PEPPER

- 4003 RATHNAWATHIE (M) and BUCKLE (KA). Effect of berry maturation on some chemical constituents of black, green and white pepper (*Piper nigrum* L.) from three cultivars. *J. Food Technol.* 19(3); 1984; 361-7

The accumulation pattern of three commercially important constituents (starch, nonvolatile ether extract and piperine) in black, green and white pepper products of a local Sri Lankan cultivar has been compared with that for the Panniyur and Kuching cultivars introduced from India and Sarawak respectively. The local cultivar contained a higher level of starch and lower

levels of non-volatile ether extract and piperine than the other two cultivars. The local cultivar has a composition satisfactory for its use in the whole berry form or for processing into a powdered spice. AA

CHILLI

- 4004 TORIJA ISASA (ME) and MARTINEZ RINCON (MC). Study of some mineral elements in different varieties of fresh and canned peppers. *Anal. Bromatol.* 35(1); 1983; 141-50 (Spanish)

By means of Atomic Absorption Spectrophotometry iron, copper, manganese and zinc, have been determined in different varieties of market peppers. Samples analyzed are red and green fresh peppers and canned red peppers. AA

DILL

- 4005 HUOPALAHTI (R). Effect of latitude on the composition and content of aroma compounds in dill, *Anethum graveolens*, L. *Food Sci.+Technol.* 17(1); 1984; 16-9

The effect of latitude on the composition and content of aroma compounds in dill (*Anethum graveolens*, L.) was studied during three years at two different localities in Finland. The aroma compounds were isolated by solvent extraction with a mixture of pentane and diethylether (1:2, v/v) followed by concentration with a Widmer column and cleaning up with a silica gel column. The aroma extracts were analysed by the glass capillary gas chromatography-mass spectrometry method. The total amount of aroma compounds in the dill grown in northern Finland was 2 to 10 times higher than in the dill cultivated in southern Finland. Also qualitative differences were observed. The results of this work point clearly out the abundance of sunlight as the crucial factor in the aroma formation in dill. AA

SENSORY EVALUATION

- 4006 URBANYI (Gy). Investigation into the interaction of different properties in the course of sensory evaluation. III. Interaction between colour, texture and flavour. *Acta Aliment.* 13(1); 1984; 39-46

Experiments were conducted to study the simultaneous interaction between colour, texture and flavour. The results indicate that if an objective assessment is to be made of samples that are only slightly different - particularly in respect of flavour which cannot be measured instrumentally - it is advisable to evaluate samples in which the colour and texture have been standardized without altering the flavour. KMD

- 4007 WILLIAMS (AA) and LANGRON (SP). The use of free-choice profiling for the evaluation of commercial ports. *J. Sci. Food Agric.* 35(5); 1984; 558-68

Paper describes a new approach to profile analysis in which each assessor produces individual profiles of the products, using his or her own terms for describing them without the need to explain the meaning of such terms. KAR

- 4008 POWERS (JJ). Using general statistical programs to evaluate sensory data. *Food Technol.* 38(6); 1984; 74-82, 84

Discusses: performance of panelists; numerical guide posts; product name

discriminator; factor analysis; product differences; discriminant analysis; principal component analysis; canonical analysis; and construction of spider web profiles. JVS

- 4009 CROSS (HL) and KEARSLEY (MW). Carbohydrate/iron interactions. Effect of carbohydrate on iron recognition taste threshold values. *Food Sci.+Technol.* 17(1); 1984; 11-5

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

- 4010 GIRI (S) and MISHRA (AK). Fungicidal and molluscicidal activity of some 3-substituted 4-hydroxycoumarin derivatives. *J. Agric. Food Chem.* 32(4); 1984; 759-62

The present study has indicated that 3-(aryloxy)-4-hydroxycoumarins with chloro and methoxy substitutes appear to be promising fungicides. The 3-(N-substituted thiocarbamoyl)-4-hydroxycoumarins appear to be a weaker category of fungicides. The molluscicidal activity of coumarin derivatives depended on their concentration and duration of exposure of test animals. JVS

- 4011 GIRI (S) and MISHRA (AK). Fungicidal and molluscicidal activity of some heteroarylcannabinols and ethylenes. *J. Agric. Food Chem.* 32(4); 1984; 762-5

Compound comprising 1-aryl-1-(substituted benzofur-2-yl)-2-benzyl cannabinoids (II) and 1-aryl-1-(substituted benzofur-2-yl)-2-phenylethylenes were synthesised. Ten such compounds were tested for fungicidal activity against *Alternaria tenuis* and *Helminthosporium oryzae* and against a snail. JVS

- 4012 CHADWICK (RW), COPELAND (MF), FROELICH (R), COOKE (N) and WHITEHOUSE (DA). Interaction between γ -hexachlorocyclohexane and the gastrointestinal microflora and their effect on the absorption, biotransformation, and excretion of parathion by the rat. *J. Agric. Food Chem.* 32(4); 1984; 755-759

Pretreatment of rats with the organochlorine insecticide lindane reduced the estimated absorption rate of parathion from the gastrointestinal tract. Lindane pretreatment also significantly reduced the metabolism of parathion to *p*-nitrophenol *in vivo*. Lindane pretreatment altered the gastrointestinal (GI) microflora by increasing the ratio of anaerobes to aerobes. Consistent with this alteration was a significantly greater retention of unaltered parathion and the microbial metabolite aminoparathion in the GI tract of the lindane-pretreated rats 1 hour after the administration of parathion. Enhanced conversion of parathion to aminoparathion together with a slower absorption rate may play a role in the antagonism parathion toxicity by lindane. AA

- 4013 MENSAH (GWK) and WHITE (NDG). Laboratory evaluation of malathion treated sawdust for control of stored-product insects in empty granaries and food warehouses. *J. Econ. Entomol.* 77(1); 1984; 202-6

Sawdust containing 0.4, 0.8 and 2.0% (AI) malathion was stored on

concrete, wood or galvanized steel for 16 weeks at 25 C and 50% RH. It is concluded that saw dust of any mesh size which contains 2% malathion could be placed on concrete floors in empty granaries and in warehouses to offer one month or more of insect control. KAR

BIOCHEMISTRY AND NUTRITION

- 4014 RUDIGER (H). On the physiological role of plant lectins. *Bioscience* 34(2); 1984; 95-9
- 4015 ANON. Proteins assessed. *Br. Food J.* 86(918); 1984; 12-5
- 4016 PREMA KUMARY (MN), ANWAR FATHIMA and SARASWATHI (G). Dietary fibre content of some food materials. *J. Food Sci. Technol. (India)* 21(2); 1984; 95-7
Cereals, (4) legumes (5) and vegetables (8) were analysed for the content of neutral detergent fibre (NDF), acid detergent fibre (ADF), lignin and crude fibre. The contents of (g/100 g) NDF was 4.6 - 10.9 in cereals, 6.4 - 19.6 in legumes and 11.1 - 21.2 in vegetables, whereas the corresponding range of values for crude fibre was 1.1 - 2.7, 0.7 - 5.3 and 1.3 - 4.1. ADF content (g/100g) was 3.1 - 5.0 in cereals, 3.7-10.8 in legumes and 8.3-16.9 in vegetables. KAR
- 4017 AVENELL (A), LEEDS (AR) and TROWELL (HC). Dietary fibre in human nutrition: A bibliography for 1980. *J. Plant. Food.* 5(2); 1983; 81-113
The bibliography covers 480 literature references published during the year 1980 on dietary fibre in human nutrition. BSN
- 4018 SANDERS (TAB). Vegetarianism: Dietetic and medical aspects. *J. Plant Food.* 5(1); 1983; 3-14
- 4019 MARTIN (CRA). Diet in stress conditions. *Br. Food J.* 86(920); 1984; 68-9, 74
- 4020 FLORES (R), IMMINK (MDC), TORUN (B), DIAZ (E) and VITERI (FE). Functional consequences of marginal malnutrition among agricultural workers in Guatemala. Part 1. Physical work capacity. *Food Nutr. Bull.* 6(1); 1984; 5-11
- 4021 IMMINK (MDC), FLORES (R), VITERI (FE), TOURN (B) and DIAZ (E). Functional consequences of marginal malnutrition among agricultural workers in Guatemala. Part II. Economics and human capital formation. *Food Nutr. Bull.* 6(1); 1984; 12-7
- 4022 NABARRO (D). Social, economic, health and environmental determinants of nutritional status. *Food Nutr. Bull.* 6(1); 1984; 18-32
- 4023 SEN (PC). The need and rationale for monitoring and evaluation of nutrition programmes. *Food Nutr. Bull.* 6(1); 1984; 50-52
- 4024 HAUTVAST (JGAJ), KNUIMAN (JT) and WEST (CE). International studies on nutrition and serum lipoproteins in children. *J. Food Nutr.* 41(1); 1984; 9-13

TOXICOLOGY AND HYGIENE

- 4025 SALEM (H), ROTH (E) and FORNANGO (J). A comparison of automated data collection and manual data collection by toxicology studies. *Arch. Toxicol. Suppl.* 6; 1983; 361-4
- 4026 WHITNEY (J). Computer recording of pathology data. *Arch. Toxicol. Suppl.* 6; 1983; 365-6
- 4027 WHITFIELD (FB) and TINDALE (CR). The role of microbial metabolites in food off-flavours. *Food Technol. Aust.* 36(5); 1984; 204-9, 213
The type of off-flavours covered include garlic like off-flavours in prawns and sand-lobsters, rotten onion-like off-flavours in prawns, earthy-muddy off flavours in canned champignons, pigsty like off-flavours in frozen French fries, and mouldy off-flavours in bulk packaged cocoa. KAR
- 4028 LEAPER (S). Synergistic killing of spores of *Bacillus subtilis* by peracetic acid and alcohol. *J. Food Technol.* 19(3); 1984; 355-60
Synergistic sporicidal effects were observed when spores of *Bacillus subtilis* SA22 (NCA 72-52) were exposed to 0.08% (v/v) peracetic acid plus 9.9% (v/v) various primary alcohols. Synergistic sporicidal responses were also found when combinations of 0.04 or 0.08% (v/v) peracetic acid plus up to approximately 20% (v/v) ethanol were used. Higher concentrations of ethanol or peracetic acid did not yield further sporicidal action. Simultaneous use of ethanol and peracetic acid is a possible method of sterilization of aseptic packaging materials. AA
- 4029 DESMARCHELIER (OM). Significance of *Vibrio* spp. in foods. *Food Technol. Aust.* 36(5); 1984; 220-22
Current knowledge of pathogenic *Vibrio* spp. is presented to assess the significance of their isolation from foods. KAR
- 4030 BUSHELL (R). Evaluation of media for the isolation of *Vibrio cholerae* from food. *Food Technol. Aust.* 36(5); 1984; 223-6
None of the methods tested were found suitable for recovering the sublethally impaired cells of *V. cholerae* from food and water. KAR
- 4031 PITT (JI). The significance of potentially toxigenic fungi in foods. *Food Technol. Aust.* 36(5); 1984; 218-9
Methods for assessing the presence of potentially toxigenic fungi in foods are outlined and discussed. Total viable counts are not a reliable indicator of fungal invasion or of mycotoxin production. However, monitoring of foods for toxigenic fungi and potential mycotoxin production can be carried out with selective media or routine enumeration methods, provided a systematic approach is used. AA
- 4032 CUTULI De SIMON (MT) and SUAREZ FERNANDEZ (G). Study of the mycoflora present in milky flour for children consumption. *Anal. Bromatol.* 35(1); 1983; 79-86 (Spanish)
- 4033 CUTULI De SIMON (MT) and SUAREZ FERNANDEZ (G). Study of genera *Penicillium* and *Aspergillus* in flour for human consumption. *Anal. Bromatol.* 35(1); 1983; 87-92 (Spanish)

- 4034 RAMA DEVI (G) and POLASA (H). Inhibition of growth and toxin production by lauric acid derivatives in *Aspergillus* species. *Curr. Sci.* 53(15); 1984; 811-3

The efficacy of monolaurin derivatives of lauric acids (lauricidin - 012, lauricidin - 812 and lauricidin - 1012), considered as generally recognised as safe (GRAS) were studied as antifungal agents and toxin inhibitors with special reference to *Aspergillus flavus*, *A. ochraceus* and *A. versicolor* isolated from maize. Results showed that the compounds were effective inhibitors of fungal growth and toxin production in all the three *Aspergillus* sp. Higher concentration of the test compounds were required for inhibition of fungal growth and toxin production on maize flour than on maize grain and liquid medium (within 100% toxin production was inhibited by all the compounds at lesser concentration than required for growth inhibition). However of the three compounds, lauricidin - 012 was more effective than others. MVG

- 4035 CUTULI De SIMON (MT) and SUAREZ FERNANDEZ (G). Determination of aflatoxins in flour for human consumption. *Anal. Bromatol.* 35(1); 1983; 93-8 (Spanish)

- 4036 HAZANI (E), TAITELMAN (U) and SHASHA (SM). *Amanita verna* poisoning in Israel. Report of a rare case out of time and place. *Arch. Toxicol. Suppl.* 6; 1983; 186-9

- 4037 LIENER (IE). Naturally occurring toxicants in foods and their significance in the human diet. *Arch. Toxicol. Suppl.* 6; 1983; 153-66

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- 4038 COHN (DF) and STREIFLER (M). Intoxication by the chickling pea (*Lathyrus sativus*): Nervous system and skeletal findings. *Arch. Toxicol. Suppl.* 6; 1983; 190-93

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- 4040 MANOR (E) and FREUNDLICH (E). Lead poisoning from ceramics in the Arab population. *Arch. Toxicol. Suppl.* 6; 1983; 275-8

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- 4042 MRINALINI (N). Pesticide hazards. A growing global problem. *Chem. Age. India.* 35(6); 1984; 347-52

- 4043 NIEBERGALL (H) and REICHMANN (H). Investigations into the behaviour of cyclohexyl isocyanate towards foodstuffs during and after migration. Part I. Behaviour towards acid amide groupings. *Dtsch. Lebensmittel-Rundschau.* 80(1); 1984; 10-12 (German)

- 4044 BAZULIC (D), STAMPAR-PLASAJ (B), BUJANOVIC (V), STOJANOVSKI (N), NASTEV (B), RUDELIC (I), SISUL (N) and ZUZUK (A). Organochlorine pesticide residues in the serum of mothers and their newborns from three Yugoslav towns. *Bull. Environ. Contam. Toxicol.* 32(3); 1984; 265-8
- 4045 PODOWSKI (AA), FERROZ (M), MERTENS (P) and KHAN (MAQ). HPLC analysis of organochlorines using UV and radioactivity flow detectors. *Bull. Environ. Contam. Toxicol.* 32(3); 1984; 301-9
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- Acorus calamus* fatty acid and sugar composition 3990
 Additives for baking industry 3773
 Aflatoxin
 flour 4035
 groundnut 3817
 Agricultural policy and world hunger 3729
 Alcohol, sporicidal effect on *Bacillus subtilis* 4028
 Aldicarb residue in potato 3827
Allium sativum See garlic
 Amla, ascorbic acid and fungus infestation 3853
Amanita verna poisoning 4036
 Amine
 beef microbiological quality 3904
 meat 3897
 Amino acid, rainbow trout 3939
 Amino acid esters in wine 3970
 Amylase activity
 starch blocker 3863
 whey and rennet 3763
 Amylase production by *B. caldolyticus* 3764
Anethum graveolens See dill
Annona atemoya composition 3859
 Antioxidant activity of sodium nitrite in meat 3894
 Antioxidant in snack food 3774
 Apple
 diphenylamine residue 3858
 enzymatic browning 3855
 keeping quality and irrigation 3857
 quality and irrigation 3857
 texture 3856
 Apple juice, RSK values 3961
 Apple puree, trace metal analysis 3754
 Aroma of dill 2005
 Aroma of tea 3967
 Ascorbic acid, mango and amla effect of fungus 3853
 Aseptic packaging of fruit and vegetable 3842
Aspergillus
 in flour 4033
 growth and toxin production inhibition 4034
Aspergillus ustus metabolites 3765
Azadirachta indica See neem
Bacillus caldolyticus, amylase production 3764
Bacillus subtilis
 sporicidal effect of paracetic acid and alcohol 4028
 Bacteria survival in meat, electrical stimulation and processing 3893
 Baker's yeast from whey 3891
 Bakery products, quality test 3876
 Baking industry, additives 3773
 Baking quality of wheat 3791
 Banana, composition 3849
Basia latifolia See mahwa
 Beef
 amine and microbiological quality 3904
 carcass property 3903
 Beef patty, organoleptic property, effect of vegetable protein 3905
 Beer, dietetic 3973
 Bell pepper, quality and CO₂ 3835
 Beverage, iron and manganese in 3951
 Biomass energy 3747
 Bitter gourd, pesticide residues in 3837
 Black currant juice, RSK value 3954
 Boron determination 3756
 Bread
 legislation 3873
 monoglyceride 3875
 mould development 3874
 quality test 3876
 rye bread, flavour 3877
 Browning of apple 3855
 Brussels sprout and glucosinolate 3830
 Bull carcass weight 3907
 Bull offal 3907
 Butter
 moisture and salt composition 3888
 vitamin determination 3889
Byssoschlamys in fruit juice 3953
 Cadmium
 determination
 apple puree 3754
 food 3755
 Caffeine in coffee 3965
Callophyllum inphyllum See Undi
Callosobruchus maculatus, effect of vegetable oil 3796
Candida See yeast
 Candy as snack food 3872
 Canned mushroom, colour and spoilage 3767
 Canola oil processing 3979
 Caramal
 milk products use 3870
 organic amino compounds 3871

I N D E X

- Abelmoschus esculentus* See okra
- Actomysin, fish, carbonyl binding 314
- Aflatoxin
 - carcinogenicity 416
 - detoxification 424
 - toxicity 416 ,424
- Air drying 5
- Alcohol, microbial inhibition 42
- Allium cepa* See onion
- Allium sativum* See garlic
- Aluminium intake and excretion 410
- Aluminium phosphide, beetle control 395
- Amino acid
 - analysis 404
 - antioxidant activity, vegetable oil 364
- 2-amino-3-methylimidazo-(4,5-f)quino-
line in beef and fish, analysis, HPLC 282
- α -amylase from agro-industrial wastes 37
- Anise, estrazole determination 34
- Antioxidant activity
 - amino acid, vegetable oil 364
 - microbial inhibition 42
- Apple
 - aflatoxin determination, TLC 348
 - citrinin determination, TLC 348
 - 'Jamba': malate and sucrose compo-
sition 201
 - malate and sucrose composition 201
 - organic acid metabolism during
ripening 174
 - patulin determination, TLC 348
 - ripening, organic acid metabolism 174
 - sensory evaluation 201
- Apple juice
 - aflatoxin determination, TLC 348
 - citrinin determination, TLC 348
 - patulin determination, TLC 348
 - quality 349
- Apricot
 - air pollution control by gas sul-
phiting during drying 175
 - drying, air pollution control by
direct gas sulphiting 175
 - sulphuring during drying, air pollu-
tion control 175
- Arsenic in canned meat product 277
- Asbestos, carcinogenicity 416
- Ascorbic acid metabolism, effect of threo-
nic acid 51
- Ash, fruits and vegetables, determination 177
- Avena sativa* See oat
- Avocado,
 - dietary fiber, determination 177
 - oil composition 200
- Bacterial growth, effect of Maillard
reaction product 30
- Bacterial spore
 - effect of acid 38
 - inhibition by antimicrobial agent 42
- Bacterial spore resistance 43
 - chlorine compound 39
 - effect of heat 40
 - hydrogen peroxide 41
- Baked products, pentosan properties 217
- Baking, triticale 73
- Banana
 - dehydration, quality changes 189
 - organic acid metabolism during ripen-
ing 174
 - ripening, organic acid metabolism 174
- Beauveria bassiana*, biological control
agent for *Oryzaephilus surinamensis* 392
- Be f
 - Brocothrix thermosphacta* isolation 283
 - cooked; 2-amino-3-methylimidazo (4,5-f)
quinoline analysis, HPLC 282
 - microbial isolation 283
 - nitrogenous heterocyclic compounds 281
 - packaging, review 280
 - psychotropic bacteria isolation 283
 - roasted
 - flavour compounds 281
 - oxazole composition 281
 - piperidine composition 281
 - pyridine composition 281
 - pyrrole composition 281
 - pyrazine composition 281
 - thiazole composition 281
 - thiazoline composition 281
 - starch degrading 273
- Beef product
 - dendeng intermediate moisture product 284

- Beer
 nitrosamine composition 356
 N-nitrosoproline and N-nitrososarcosine determination 357
Beetle control, effect of aluminium phosphide 395
Beetroot extraction 132
Bendiocarb residues, fruits and vegetables, determination 180
Benzo(a)pyrene metabolism in mouse liver, effect of alfalfa 166
 brussels sprouts 166
 cabbage 166
 Illicium verum 166
 Schizandra chinensis 166
Beverages
 alcoholic: phenol determination, GLC 351-2
 benzoic acid separation, GLC 345
 colour separation and identification, TLC 344
 sorbic acid separation, GLC 345
Bileberry, aroma analysis, GC-MS 183
Biological media, foam behaviour 25
Biomass energy 17
Biscuit, water activity 229
Bixa orellana seed oil, chemical composition 110
Black bean, cooking quality 96
Black gram protein, properties 100
Blood coagulation, effect of garlic 379
Blueberry
 aroma analysis, GC-MS 183
 volatile composition, analysis GC-MS 182
Bluefish carcass, binding properties 313
Bogberry, aroma analysis, GC-MS 183
Boletus edulis See mushroom
Bologna type sausage, vacuum packed: microbial growth 279
Bonito, stored: colour determination 328
Brassica leaf protein 160
Brassica napobrassica See Swede
Bread
 fermentation, effect of inositol phosphate 227
 inositol phosphate, effect of fermentation 227
 Iranian: zinc composition 228
 wheat flour's: water binding 84
Broiler
 egg characteristics and weight 308
Broiler (contd.)
 purine composition 300
 quality; effect of sodium tripolyphosphate 299
 shelflife; effect of sodium tripolyphosphate 299
 sodium tripolyphosphate treated, effect on
 quality 299
 shelflife 299
Bromide, toxicity analysis 412-4
Brussels sprouts
 effect of benzo(a)pyrene metabolism in mouse liver 166
Butter
 fatty acid determination, GC 238
 lactose fermenting yeast 248
Butter milk powder, nitrosamine detection 249
Butylated hydroxyanisole in soyabean oil, determination, GC 372
Butylated hydroxytoulene in soyabean oil, determination, GC 372
Cabbage
 effect on benzo(a)pyrene metabolism in mouse liver 166
 black speck disease 165
 stored: black speck disease; effect of atmosphere 165
 benomyl 165
 sodium hypochlorite 165
Cajanus cajan See Pigeon pea
Cake flour, chlorinated: toxicity 231-3
Calabaza, dietary fiber determination 177
Can
 cooling 7
 external corrosion during thermal treatment 13
Canavalia gladiata seed oil
 chemical composition 110
Canned food
 flame sterilization 9
 thermally processed: steam consumption 8
Capsicum
 Californian:
 aroma analysis, GC-MS 169
 volatile compounds analysis, GC-MS 169
carbaryl, effect on rice fungal infection 72
Carbaryl residues in fruits and vegetables, determination 180

- Carbofuran residues in fruits and vegetables, determination 180
- Carbohydrate, microscopic study 215
- Carbonyl binding, fish actomyosin 314
- Carcinogenicity, quercetin and kaempferol 20
- Carcinogens in food 416
- Carrot
 - aroma 135
 - cell sap concentration 134
- Carrot bar, dried: quality 136
- Cassava
 - cohesiveness: effect of glutathione 149
 - dietary fiber determination 177
 - flavourings 150
- Cauliflower
 - canning 167
 - physicochemical characteristics 167
- Cellulose
 - fruits and vegetables, determination 177
- Cereal bran, microbial counting method 59
- Cereal products
 - animal residues detection 62
 - niacin analysis 61
 - niacinamide analysis 61
 - vitamin-B analysis 61
- Cereals
 - animal residues 63
 - fumigant residues determination, GC 64
- Chapati from triticales 73
- Cheese
 - Camembert; lipid oxidation 262
 - cheddar:
 - harp seal protease as rennet substitute 260
 - riboflavin determination 303
 - corynebacterium: exopolysaccharide production, characterization 261
 - cottage: riboflavin determination, HPLC 303
 - Domiat: manufacture 263
 - fatty acid determination, GC 238
 - quality, effect of milk pasteurization 259
 - ultrafiltration 258
- Cheese-whey, lactose fermenting yeast 248
- Chicken
 - tandoori: preparation 298
 - zearalenone determination, HPLC 297
- Chick pea
 - cooking quality 96
 - starch characteristics 101
- Chitin
 - chitosan processing 325
- Chitosan properties 325
- Chlorella lipid, 3-, 6-, and 9- carbon ozonolysis product 365
- Chlorine compound, saponicidal activity 39
- Chlorpyrifos-methyl, effect on *Oryzaephilus surinamensis* 396
- Cicer arietinum* See chick pea
- Citral, off-odour substances 54
- Citrullus colocynthis* oil characteristics and composition 196
- Citrullus vulgaris* See ogiri
- Citrus
 - chemistry 190
 - parathion residues analysis 191
 - quality 190
 - technology 190
- Citrus juice
 - chemistry 190
 - quality 190
 - technology 190
- Clam, pickling 316
- Clarias lazera*, Nigerian: polynuclear aromatic hydrocarbon determination 321
- Clostridium botulinum*
 - detection 418
 - estimation 419
- Coconut, dietary fiber determination 177
- Coconut oil
 - composition effect of heating with water 360
- Cocoyam, cohesiveness; effect of glutathione 149
- Cod fillet; stored; shelflife 333
- Colour
 - degradation, effect of ascorbic acid development 55
 - numbers and synonym 56
 - regulatory history 55
 - types 55
 - uses 55
- Confectionery
 - colour separation and identification, TLC 344
- Copper, canned meat product 277
- Copra meal, polysaccharide analysis 130
- Cottonseed
 - Aspergillus niger* extract toxicity 155
 - processing 112
 - stored: *Aspergillus niger* extract toxicity 115

Fruits

- bottled: spoilage by yeast 179
- canned:
 - imports: Federal Republic of Germany 173
 - spoilage by yeast 179
- carbamate residues determination 180
- irradiated: mutagenicity 178
- organic acid metabolism during ripening 174
- pesticide residues determination 396
- preservation by irradiation 178
- processed: spoilage by yeast 179
- quality: effect of fructose corn syrup 176
- ripening: organic acid metabolism 174
- spoilage by yeast 179
- sulphited: spoilage by yeast 179
- Fumigant residues, cereals, determination, GC 64
- Furfural, melanoidin synthesis 23

Gadus morhua See cod

Gari

- cohesiveness, effect of
 - glutathione 149
 - flavourings 150
 - lactic acid isolation 150
 - pyrazine isolation 150

Garlic

- Biochemical effect 379
- physiological effect 379
- Genetic engineering 399
- Glutathione effect on food cohesiveness 149
- Glycine, melanoidin synthesis 23-4
- Grain bed aeration 6
- Grape, ethyl 3-mercaptopropionate isolation, GC-MS 188

Grapefruit

- dietary fiber level, determination 177
- packed in polyethylene film
 - quality 192
 - water loss 192
- Grapefruit juice
 - chemistry 196
 - quality 196
 - technology 196
- Green gram protein characteristics 106

Groundnut

- aflatoxin removal 116
- arachin solubility 111
- Malagasy: composition 99
- Groundnut meal, α -amylase production by *Aspergillus oryzae* 37
- Gyromitrin, DNA methylation 50
- Hake, irradiated, shelflife 334
- Heart disease, role of polysaccharide 216
- Hemicellulose, fruits and vegetables, determination 177
- Hemichronis fasciatus*
 - Nigerian: preserved; polynuclear aromatic hydrocarbon determination 321
- Herring, polychlorinated biphenyl residues analysis 331
- Histamine composition, fish, determination 323
- Hop
 - tricyclic sesquiterpene characterization 358
- Horse gram, starch characteristics 101
- Humulus lupulus* See hop
- Hydrocolloid, organoleptic properties 387
- Hypocholesteremic activity effect of garlic 379
- Hypoglycerine activity, effect of garlic 379
- Icecream
 - aflatoxin M₁ 426
 - photooxidation protection 264
- Illicium verum* effect on benzo(a)pyrene metabolism in mouse liver 166
- Indian standards; Prevention of Food Adulteration, anomalies 4
- Insect attractant, hydrolysed protein insect bait 388
- Ipomoea batatas* See sweet potato
- Iron bioavailability 402
- Jam, spoilage by yeast 179
- Jelly, spoilage by yeast 179
- Kaempterol, carcinogenicity test 20
- Khoa
 - Staphylococcus aureus*, enterotoxin production 251
 - thermostable deoxyribonuclease production by *Staphylococcus aureus* 251
- Kiwi fruit, dietary fiber determination 177
- Kluyveromyces marxianus* See yeast

- Lactobacillus* growth in pork, effect of sodium chloride 291
- Lamb
 carcass
 chilling 281, 287
 electrical stimulation 280, 281, 286-7
 hot boning 281, 287
- Lard, hydroxyisoflavone as antioxidant 362
- Lead
 canned meat product 277
 toxicity effect of dietary fat 411
- Leaf protein, chlorogenic acid binding 162
- Leaf protein concentrate
 nutritive value 163
 preparation and process modification 163
- Legume composition
 Malagasy: composition 99
- Lemon, ethrel treated and packaged: quality 193
- Lemon flavour; deterioration 54
- Lemon juice
 chemistry 190
 quality 190
 technology 190
- Lens esculentum* See lentil
- Lentil
 cooking quality 96
 Malagasian: composition
- Leucerne
 protein concentrate:
 nutritive value 159
 quality 157-8
- Lignin, fruits and vegetables, determination 177
- Lime juice
 chemistry 190
 quality 190
 technology 190
- Lime oil, manufacturing process 194
- Lime seed oil, extraction 366
- Linseed protein 117
- Linum mysornesis* seed oil chemical composition 110
- Lipid, fungal: production, effect of carbon and nitrogen 377
- Litchi juice, preparation 350
- Litjanus blackfordii* See red snapper
- Lobster tail
 export 309
 freezing 309
- Locust bean
 African:
 enzyme 107
 oligosaccharide 107
 reducing sugar 107
- Lolium perenne* see rye grass
- Low-cost high protein food, Nigerian 343
- Lupine
 amino acid composition 164
 composition, analysis 405
 processing, aqueous extraction 172
 protein
 electrophoretic mobility 164
 solubility 164
- Lysine-fructose browning, effect of L-aspartic acid and L-glutamic acid 31
- Lysine-glucose browning effect of L-aspartic acid and L-glutamic acid 31
- Mackerel, heated: rancidity control, effect of onion juice and peel 329
- Macrobrachium idella* See rice-shrimp mixture
- Madhuca latifolia* See Mowrah fat
- Maize
 aflatoxin analysis 94
 aflatoxin production inhibition by pesticide 95
 fungal inhibition by pesticide 95
 starch, α -amylase production by *Aspergillus oryzae* 37
 starch, effect of γ -rays 92
 sulphur dioxide estimation 93
- Malanga, dietary fiber determination 177
- Malathion effect on rice fungal infection 72
- Malondialdehyde, vegetable oil, determination, HPLC 363
- Malt product, manufacture and use 359
- Mandarin juice
 chemistry 190
 quality 190
 technology 190
- Mango
 'Alphonso': volatile constituents 199
 'Baladi': volatile constituents 199
 organic acid metabolism during ripening 174
 'Ratna': variety 198
 ripening: organic acid metabolism 174
- Meat
 amine, alcoholic extraction 267
 ammonia alcoholic extraction 267

Meat (contd.)

- chub packed luncheon meat:
 - amyololysis 292
- cured: nitrite determination 268
- muscle metabolism 277
- polycyclic aromatic hydrocarbon determination, GC 271
- quality
 - effect of handling 266
 - effect of processing 266
- Salmonella* isolation 269
- tenderness. 277
 - measurement by Kramer shear press 276
- Meat emulsion, water binding capacity 274
- Meat homogenate, amyololysis 292
- Meat product
 - canned: trace elements 277
 - starch determination 272
- Meat starch slurries, amyololysis 292
- Medicago sativa* see lucerne
- Melanoidin, furfural and glycine synthesis 23-4
- P-mentha-1,5-dien-8-ol(3a) (from)
 - citral, off-odour substance 54
- P-mentha-1,5-dien-8-ol(b) (from)
 - citral, off odour substance 54
- Merluccius merluccius* See hake
- Methionine, seed composition analysis 405
- 2-methoxyethyl mercury chloride,
 - effect on rice fungal infection 72
- Methyl mercury, fish, contamination, determination, GLC 335
- 4-methyl-1-phenylpentan-2-ol, toxicity 415
- Microbial growth, pork, effect of sodium chloride 291
- Microbial isolation, *Brocothrix thermosphacta*, beef 283
- Micrococcus* growth, pork, effect of sodium chloride 291
- Microflora counting method, cereal bran 59
- Microorganism
 - effect of acid on spore 38
 - spore resistance to chlorine compound 39
- Micropogon undulatus* See croaker
- Microwave sterilizer, vegetables 151
- Milk
 - acidophilic: effect on rat body 247
 - cholesterol level 247
 - liver 247

Milk (contd.)

- casein formation 235
- chlorinated hydrocarbon analysis, GC 240
- cloxacillin determination; HPLC 243
- fatty acid determination, GC 238
- formaldehyde determination, HPLC 239
- Goat's: protein analysis 235
- micelle size 235
- microbial analysis 36
- pasteurized: microbial analysis 36
- pencillin detection 242
 - HPLC 243
- sheep's: protein analysis 245
- ultrafiltration 258
- viscosity 234
- Milk fat
 - fatty acid determination, GC 238
 - lipase and phospholipase effect 237
 - solid content determination 236
- Milk gel
 - properties; effect of pasteurization 246
 - storage 246
- Milk powder
 - fatty acid determination, GC 238
 - nitrosamine detection 249
 - riboflavin determination, HPLC 303
 - vitamin stability 250
- Milk products
 - lactose determination 244
 - lactose fermenting yeast 248
- Milling, triticale 73
- Moraxella* growth, pork, effect of sodium chloride 291
- Morpholine, food, packed, analysis 14
- Mowrah fat
 - modification by methyl ester triglyceride 375
- Multiple regression approach optimization research 384
- Mung bean, cooking quality 96
- Muscle protein
 - analysis, SDS gel electrophoresis 270
 - degradation 270
- Mushroom
 - aflatoxin detection 49
 - Aspergillus* occurrence 49
 - enterotoxin detection 48
 - gyromitrin, DNA methylation 50
 - staphylococcal food poisoning 48
 - Staphylococcus aureus* growth 48
- Mussel, pickling 316
- Mustard, Indian: oil yield 367

Mutton

quality: effect of electrical
stunning 285

Salmonella isolation 269

stunning effect on
quality 285

Myofibrillar protein property: effect
of electrical stimulation 265

National Information Centre for Food
Science and Technology Services 3

Niger seed oil composition, effect
of heating with water 360

Nitrite, microbial inhibition 42

Nitrosamine carcinogenesis 416

N-nitrosomorpholine, food, packed;
analysis 14

Oat

fatty acid composition 86

Norwegian:

chemical composition 87

nutritive value 87

Ogiri production, biochemical changes
197

Oils

fatty acid composition 376

hydroxyl isoflavone as antioxidant
362

tricresyl phosphate estimation,
colorimetry 361

Okra

packed in polyethylene bag; shelf
life 168

shelflife

effect of packing in polyethylene
bag 168

effect of water-mustard oil 168

Olive oil

aflatoxin B₁ determination 368

ochratoxin A determination 368

Onion

Turkish: ethereal oil 131

Onion juice effect on shark and mack-
erel rancidity 329

Optimization

consumer oriented 385

multiple regression approach 384

product 383

Orange

ethylene treated:

susceptibility to *Penicillium*
italicum 195

organic acid metabolism during
ripening 174

Orange (contd.)

ripening: organic acid metabolism 174

Orange juice

aflatoxin M₁ stability 426

chemistry 190

limonin composition 347

quality 190

effect on ethylene treated fruit
195

Organophosphorus insecticide

effect on *Oryzaephilus surinamensis*
394

toxicity analysis, phosphorus-31 NMR
393

Oryzaephilus surinamensis

effect of organophosphorus insecticide
394

Beauveria bassiana fungus as biological
control agent

Ovomucoid, peptic digested: properties
302

Oxazole, roasted beef 281

Oysters, pickling 316

Packaging

food 11

processed food 12

Packaging materials

N-nitrosamine analysis 14

Paddy

moistured: preservation using sodium
chloride 66

preservation using sodium chloride 66

Paper food packaging, N-nitrosamine
analysis 14

Paperboard, food packaging, N-nitrosamine
analysis 14

Paprika; insect fragment contaminated 380

Paraben, microbial inhibition 42

Parathion residues, citrus, analysis 191

Passiflora edulis see passion fruit

Passion fruit

aroma composition 185

cyanogen composition 184

Passion fruit seed oil composition 110

Pate product, canned: acceptability 326

Pea, frozen: dithermal storage 97

Peach

air pollution control by gas sulphur-
ing during drying 175

drying; air pollution control by direct
gas sulphuring 175

sulphuring during drying, air pollu-
tion control 175

- Pear
- aflatoxin determination TLC 348
 - air pollution control by gas sulphuring during drying 175
 - citrinin determination, TLC 348
 - drying, air pollution control by direct gas sulphuring 175
 - patulin determination, TLC 348
 - sulphuring during drying air pollution control 175
- Pear juice
- aflatoxin determination, TLC 348
 - citrinin determination, TLC 348
 - patulin determination, TLC 348
- Pearl millet
- α -amylase purification and properties 89
 - mineral composition 88
- Pectin, viscosity 19
- Pennisetum typhoideum* See pearl millet
- Pentosan baked goods, properties 217
- Peppermint
- carbofuran residues determination 381
 - 3-hydroxy carbofuran residues determination 381
- Peppermint oil
- carbofuran residues determination 381
 - 3-hydroxycarbofuran residues determination 381
- Perch, packed: moisture loss 311
- Pesticide residues analysis 397
- Pesticides, carcinogenesis 416
- Phaseolus aureus* See mung bean
- Phaseolus mungo* See black bean
- Phytic acid, calcium binding 27
- Pigeon pea, cooking quality 96
- Pindak bean, starch characteristics 108
- Piperidine, roasted beef 281
- Pirimicarb residues, fruit and vegetables, determination 180
- Plant oil
- arsenic determination 315
 - bromine determination 315
 - iodine determination 315
 - selenium determination 315
- Pogonias cromis* See flounder
- Polycyclic aromatic hydrocarbon, carcinogenesis 416
- Nigerian: preserved; fish, determination 321
- Polysaccharide and heat disease 216
- Polysaccharide metabolic effect 216
- Pork
- electrically stimulated; properties 288
 - Lactobacillus* growth, effect of sodium chloride 291
 - microbial growth, effect of sodium chloride 291
 - Micrococcus* growth, effect of sodium chloride 291
 - Morax* growth, effect of sodium chloride 291
 - properties, effect of chilling 288
 - sausage
 - effect of sodium nitrite on aflatoxin production 294
 - Aspergillus parasiticus* growth 294
 - microbial characters 293
 - effect of processing 293
 - sensory evaluation 293
 - texture, effect of processing 293
 - starch degrading ability 273
 - Versinia enterocolitica* plating media, isolation 289
- Pork starch slurries, amylolysis 292
- Potato
- blanching 140
 - characteristics 144
 - composition 144
 - degraded amylose, analysis, GC 146
 - irradiation 143
 - microwave sterilization, texture improvement 152
 - processing: enzymatic 138
 - shelflife 142
 - solanine composition 141
 - texture 144
 - improvement by sterilization 152
- Potato chip browning, effect of aspartic and glutamic acid 31
- Potato fries
- effect of blanching on vitamin C 145
 - vitamin C retention; effect of blanching 145
- Potato peel, α -chaconine composition 139
- Potato peel product
- α -chaconine composition 139
 - α -solanine composition 139
- Poultry chiller water, hydrogen peroxide as bactericide 96
- Preserves, acetic acid 199
- Prevention of Food Adulteration Rules anomalies 4
- Primiphos-methyl
- effect on *Oryzaephilus surinamensis* 396

- Processed food, packaging 12
- Propoxur residues, fruits and vegetables, determination 150, 155
- Protein
- bioassay 403
 - emulsifying properties 26, 28
 - foaming ability 26, 29
 - hydrophobicity 26, 28
 - thermal function 26
- Protein insect bait 388
- Protein rich baby food, vegetable based 342
- Protein rich food, Nigerian 343
- Psophocarpus tetragonolobus* See winged bean
- Pueraria tuberosa* starch characteristics 221
- Pumpkin
- cucurbitin solubility 111
 - nutritive value 171
- Pyrazine, roasted beef 281
- Pyridine, roasted beef 281
- Pyrrole, roasted beef 281
- Quail's egg, shell quality 307
- Ragi, mineral composition 88
- Rapeseed flour, phenolic acids 120
- Red snapper, packed; moisture loss 311
- Response surface methodology 383
- Rheology, food 386
- Rice
- cooked
 - 2-acetyl-1-pyrroline 71
 - aroma 70-71
 - texture 70 - fungal infection effect of fungicides 72
 - parboiling, effect on
 - flavour 70
 - texture 70 - water activity 69
- Rice bran
- α -amylase production by *Aspergillus oryzae* 37
 - composition 67
 - nutritive value 67
- Rice bran oil
- composition 67
 - nutritive value 67
- Rice bran protein, dehydration 60
- Rice shrimp mixture, fermented; biochemical changes 68
- Rice straw, α -amylase production by *Aspergillus oryzae* 37
- Ryegrass, leaf protein concentrate: nutritive value 157-9
- Saccharomyces cerevisiae* See yeast
- Salad, spoilage by yeast 179
- Salfat, modification by methyl ester-triglyceride 375
- Salmon, canned: ethanol analysis, GC 322
- Salmonella* toxin synthesis, effect of cultural conditions 420
- Sarotherodon galileus*, Nigerian, preserved: polynuclear aromatic hydrocarbon determination 321
- Sarotherodon niloticus*, Nigerian; preserved: polynuclear aromatic hydrocarbon determination 321
- Sausage
- beef's; starch degrading ability 273
 - bologna type; vacuum packed; microbial isolation 279
 - pork's; starch degrading ability 273
- Schizandra chinensis*, effect of benz(a)pyrene metabolism in mouse liver 166
- Sebastes marinus* See perch
- Seeds, amino acid composition analysis 405
- Semolina
- roasting
 - carbonyl compound formation 83 - roasting, effect on
 - lipids 83
 - proteins 83
 - sugars 83
 - viscosity 83
- Sensory evaluation, food 382
- Serotonin, food determination and identification 32
- Sesame oil in fatty food contaminated: determination 369
- Shark
- export 327
 - stored: rancidity effect of onion juice and peel 329
- Shellfish
- organic compound determination 320
 - pickling 316
 - species identification, agarose electrofocussing 337
 - toxin determination, HPLC 338
- Shorea robusta* See salfat

- Shrimp
 - breeding 340
 - lipids characterization 339
 - Nigerian: composition 312
- Simarouba glauca* fat, characteristics and composition 378
- Sitophilus*
 - effect on harmone 390
- Sitophilus granarius*
 - amorphous silica toxicity 391
- skim milk, riboflavin determination, HPLC 303
- Skim milk powder, nitrosamine detection 249
- Skipjack tuna, stored; colour deterioration 328
- Sodium bisulphite, yeast gene conversion 18
- Sodium carboxymethyl cellulose
 - viscosity 19
- Sodium chloride
 - antimicrobial activity 42
 - pork 291
- Solvent extraction, soyabean lipid 370
- Sorbate, antimicrobial activity 42
- Sorghum
 - amino acid composition 91
 - cooking 90
 - milling 90
 - protein composition 91
- Soyabean
 - α -chymotrypsin 123
 - drying 119
 - lipid solvent extraction 370
 - plasteins 123
 - quality effect of
 - dolomite 121
 - nitrogen 121
 - phosphorus 121
 - potassium 121
 - trypsin inhibitor 98
 - whipped topping 118
- Soyabean flour
 - phenolic acids 120
- Soyabean oil
 - BHA, BHT and TBHQ determination, GC 372
 - refined; quality; effect of processing 374
- Soyabean oil emulsion
 - coalescence of oil droplet 373
- Soyabean oil - tallow
 - properties 371
 - use as margarine oil 371
- Soy beverage
 - calcium added: effect on
 - pH 125
 - stability 125
 - viscosity 125
- Soy protein
 - analysis 123
 - concentrate, dehydration 60
 - 11S glycinin solubility 111
 - immunological properties 122
- Soy-whey beverage, production cost 126
- Soy-whey beverage powder, production cost 126
- Spinach leaf protein 161
- Sporolactobacillus inulinus*
 - detection 43
- Squid
 - export 309
 - freezing 309
- Starch
 - chemistry: Symposium 219
 - defatted heat-moisture treated, physico-chemical properties 223
 - processing using hydrocyclone 224
 - Pueraria tuberosa*; characteristics 221
 - technology: symposium 219
- Starch manufacture, heat and power generation 220
- Sterilization, microwave; vegetable texture improvement 152
- Strawberry jam
 - quality 187
 - sweeteners use 186
- Streptococcus lactis*
 - acetaldehyde devermination, HPLC 423
- Sucker, minced: utilization 336
- Sugar determination, HPLC 218
- Sunflower seed
 - chlorogenic acid determination, HPLC 129
 - protein analysis 128
- Swede, glucosinolate 133
- Sweet potato
 - quality effect of storage 147
 - storage effect on quality 147
- Sweet potato flower
 - amino acid composition 148
 - nutritive value 148
- Swordfish, methylmercury determination, GLC 335

- Tandoori chicken, preparation 298
Tapioca starch, α -amylase production
by *Aspergillus oryzae* 37
Taro, dietary fiber determination 177
TBHQ, soyabean oil, determination, GC
372
Telfaria occidentalis See pumpkin
Terminalia catappa seed oil chemical
composition 110
Texture, food 386
Thermal process, lethality, effect of
cooling 7
Thermal processing, external corro-
sion of food cans 13
Thiazole, roasted beef 281
Thiazoline, roasted beef 281
Thiophanate, effect on rice fungal
infection 72
Thiram, effect on rice fungal infec-
tion 72
Threonic acid, effect of ascorbic acid
metabolism 51
Tilapia zilli, Nigerian, preserved:
polynuclear aromatic hydrocarbon
determination 321
Tin, canned meat product 277
Tortilla, (Maize/soyabean based)
effect of processing on
lectin composition 127
trypsin inhibitor 127
Trace elements, food, estimation 407
Trifolium repens See white clover
Triticale
baking 73
chapati 73
milling 73
Trout
Sauce:
chemical composition 324
sensory characteristics 324
Tryptophan
degradation 406
seed: composition, analysis 405
Tuna
methylmercury determination, GLC 335
stored: colour determination 328
Turkey, aflatoxin residue determina-
tion 301
Ultrafiltration, food processing app-
lication 258
Vegetable oil
amino acid antioxidant activity 364
antioxidant activity of amino acid
364
Vegetable oil (contd.)
malondialdehyde determination, HPLC
363
Vegetables
brined: spoilage by yeast 179
canned: importers, Federal Republic
of Germany 173
Carbamate residues determination 180
extract: mutagenicity 156
microwave sterilization: texture
improvement 152
Netherland's: extract, mutagenicity 156
pesticide residues, determination 396
processe
cellulose composition 154
hemicellulose composition 154
lignin composition 154
spoilage by yeast 179
propoxur residues, determination 155
protein rich baby food 342
Spanish: pectic substance 153
spoilage by yeast 179
sterilization: texture improvement 152
stored in bin's: ventilation 151
texture improvement, microwave steri-
lization 152
Vicia faba See faba bean
Vigna unguiculata See cow pea
Vitamin A, cereal product analysis 61
Vitamin B microbiological assay 407
Vitamin C, 408
Vitamin D, dietary fibre interaction 409
C-vitamin E, dietary fibre interaction
409
Water, tributoxylethyl phosphate deter-
mination 35
Wheat
cleaning 74
composition 75
malathion degradation 81
mineral composition 75
protein composition 75
Rhizopertha dominica infestation 80-81
Sitophilus infested:
effect of harmone 390
Sitophilus granarius infestation 81
starch gelatinization 76
stored, malathion degradation 81
vitamin composition 77
vomitoxin contamination 78
Wheat bran
-amylase production by *Aspergillus*
oryzae
Wheat flour, mill 82

Wheat flour dough, water binding 84

Wheat germ

composition 85

nutritive value 85

processing 85

utilization 85

Whey protein concentrate

isolation and characterization 257

protein changes due to heat 256

Whey protein isolate

isolation and characterization 257

Whitebean, drying 119

White clover

leaf protein concentrate: nutritive
value 159

quality 157-8

Wine

amine determination 354

chemical composition 353

mutagenicity during aging 355

Winged bean

hemmagglutinating activity 109

phytate composition 109

tannin level 109

trypsin inhibitor 98

Yam

cohesiveness: effect of glutathione
149

dietary fiber determination 177

Yam-cottonseed flour

nutritive value 114

Yam-soyabean flour

nutritive value 114

Yeast

characteristics 45

endopolygalacturonase characteriza-
tion 44

gene conversion induction by
sodium bisulphite 18

production: effect of fermentation,
cultivation and drying 46

Yellow fin

stored; colour determination 328

Yoghurt

acidity 253

nutritive value 254

riboflavin determination, HPLC 303

sugar determination GLC 255

Zanthoxylum rhetsa

seed oil chemical composition 110

Zinc, canned meat product 277

- Apricot nectar
 - canned: contamination reduction 451
 - viscosity, determination 740
- Arctic islandica* See clam
- Aroma compounds
 - diastereomeric esters 517
 - enantiomeric esters 517
- Ascorbic acid, grape juice colour stability 741
- Aspartame See sweetener
- Aspergillus*
 - growth 490
 - pectolyte enzyme formation 491
 - water activity 490
- Bacillus cereus* See bacteria
- Bacteria
 - bean, sprouted: enterotoxin production 554
 - glycosidase production 484-5
 - rapeseed meal glucosinolate degradation 567
- Baked products
 - ingredients: German law and labelling 639
 - linseed use 640
 - production 643
 - pumpkin seed use 640
 - quality 518, 643
- Baker's yeast, manufacture 488
- Bakery
 - automation 644
 - flour delivery 644
- Baking industry, starch; enzymatic saccharification 645
- Balsam oil 763
- Banana, 'Samoa': cooking 615
- Baobab
 - fatty acid composition, determination 566
 - oil composition, determination 566
- Barium chloride, water activity determination 462
- Barley, stored, vitamin E composition 551
- Barley flour, dietary fiber composition 520
- Beans
 - cooking quality:
 - effect of storage 553
 - sprouted:
 - aflatoxin contamination 554
 - enterotoxin contamination 554
- Beans (contd)
 - microbiological analysis 554
 - stored: effect on cooking quality 553
- Beef
 - amino acid determination 802
 - calcium determination, titrimetry 699
 - carcass; electrical stimulation 685
 - collagen determination 688
 - colour, effect of electrical stimulation 687
 - cooking, effect on texture 693
 - cooking effect on quality 694
 - differentiation 682
 - fat determination, NIR 697
 - maturity 688
 - microwave cooking, effect on quality 694
 - mineral composition effect of marination 691
 - moisture determination, NIR 697
 - muscle
 - effect of aging 685
 - composition, effect of marination 691
 - effect of electrical stimulation 685
 - effect of hot boning 685
 - myoglobin effect of electrical stimulation 687
 - palatability 688
 - protein determination, NIR 697
 - Pseudomonas fragi*, growth, determination, electron microscopy 690
 - quality
 - effect of broiling 694
 - effect of cooking temperature 693
 - effect of cooking intensity 693
 - effect of microwave cooking 694
 - tenderness, effect of marination 691
 - vacuum packaged, microbial growth 689
- Beer
 - folic acid degradation 762
- Benzoic acid, effect on yeast 500
- Ber, tannin composition 631
- Bergamont oil 763
- Berry, pesticide residue, determination 634
- BET constants
 - sorption isotherm data evaluation 443
- Betalain, toxicity 813
- Beverages, sugar determination by enzyme electrode 469

- Biochemical reactor, HTST extruder 518
- Biscuit
 manufacture by extrusion cooking 650
- Bittergourd, quality 604
- Blackberry
 fiber composition 582
 pectin composition 582
- Blood serum
 cow's: banminth administered; pyran-
 tel determination, TLC 664
- Blue berry
 fiber composition 582
 pectin composition 582
- Boletus edulis* See mushroom
- Bovine, muscle tenderness, measure-
 ment 692
- Boysenberry
 fiber composition 582
 pectin composition 582
- Brassica oleraceae* See cabbage
- Bread
 dough: α -amylase activity 641
 electron microscopic study 539, 541
 firmness measurement 649
 linseed use 640
 manufacture 647
 pumpkin seed use 640
 starch product decomposition 518
 effect of sunflower protein 540
 wheat based:
 fiber composition 648
 sensory properties 648
- Broccoli
 fiber composition 582
 pectin composition 552
- Brochothrix thermosphacta* growth in
 vacuum packaged beef 689
- Broilers, growth and tissue, effect
 of ochratoxin A 523
- Broiling, effect on beef quality 694
- Brussels sprouts
 fiber composition 582
 pectin composition 582
- Bull meat
 muscle, texture measurement 686
- Butylated hydroxyanisole
 antimicrobial effect 498-9, 503
- Butylated hydroxytoluene antimicrobial
 effect 498-9, 503
- Cabbage
 canning: cultivar suitability 593
 crack resistance 592
 cultivar suitability for canning
 593
- Cabbage (contd.)
 glucosinolate extract, mutagenicity
 594
 pectic polysaccharide 595
 physicochemical characteristics 593
 prothiophos residues, determination,
 GC-MS 596
 sludge grown: mutagenicity 594
 texture 592
- Cake
 composition 654
 fat determination 655
 high fructose corn syrup use 653
 sensory property 654
 sucrose determination 655
- Calcium
 beef, determination, titrimetry 699
 effect on:
 copper intake in rats 466
 iron intake in rats 466
 poultry, determination, titrimetry
 699
 effect on zinc intake in rats 466
- Calcium chloride, apple, shelf life
 625-6
- Calcofluor, oat; β -D-glucan analysis
 542
- Callinectes sapidus* See crab
- Callosobruchus maculatus*
 bambara groundnut, control by vege-
 table oil 793
 cowpea, control by vegetable oil
 793
- Camel meat differentiation 682
- Cancer magister* See Crab
- Canned food, nutritional quality 437
- Canning, sweetened mango puree 621
- Cans, open top sentory cans: quality
 449
- Carbohydrate, cereals, composition 519
- Carcinus meanas* See crab
- Carp, myofibril protein: effect of
 oxidation 724
- Carrot
 fiber composition 582
 pectin composition 582
- Capsicum annuum* See red pepper
- Casein, amino acid analysis 802
- Cashew nut, chemical changes during
 aflatoxin production 609
- Ceiba pentandra* See kapok
- Celery seed oil 703
- Cellulose, single cell protein produ-
 ction by *Aspergillus terreus* 492

- Cereal flour, baking quality 518
- Cereal processing
 - documentation 518
 - microbiological evaluation 518
- Cereal products, DDT residues 522
- Cereals
 - analysis, capillary isotachophoresis 518
 - DDT residues 522
 - glutelin pattern 521
 - mineral composition 518
 - mycotoxin 523
 - pesticide 518
 - post-harvest loss 518
 - prolamine pattern 521
 - protein analysis 518
 - protein and coeliac disease 518
 - starch damage 518
 - yeast isolation 525
- Cheese
 - amine determination, HPLC 477
 - Cheddar:
 - production 672
 - quality 672
 - mozzarella: rheology 675
 - sodium composition 673
 - water activity effect of temperature 462
- Cheese whey, single cell protein production 674
- Cherry, serotonin composition, determination, spectrofluorimetry, and TLC 612
- Chervil oil 763
- Chicken
 - microwave cooking and poisoning 704
 - pressure cooking and poisoning 704
- Chitin immobilized- α -amylase high glucose syrup 721
- Chlorflurenol
 - red pepper, effect on weight 599
 - yield 599
- Chocolate, water activity, effect of temperature 462
- Chromosomal damage, ethylene oxide 809
- Citric acid production from whey permeate by fermentation 671
- Citrobacter intermedium* See bacteria
- Citrus
 - bioflavonoid extract, determination, HPLC 616
 - Citrus (contd.)
 - flavour components 745
 - mineral oil coating, determination, GC 610
 - parafin wax coating, determination, GC 610
 - Citrus essence
 - composition 745
 - production 745
 - Citrus juice
 - clouding agent 744
 - debitting, β -cyclodextrin 743
 - flavour components 745
 - limonin, debittering, β -cyclodextrin 743
 - naringin, debittering, β -cyclodextrin 743
 - preserved: quality 746
 - quality
 - effect of preservation 746
 - effect of storage 745
 - Citrus juice vesicle, utilization 742
 - Citrus oil
 - composition 618
 - flavour 618
 - Citrus peel, fiber utilization 742
 - Citrus waste
 - ethanol 617
 - methane 617
 - protein 617
 - wine 617
 - Cladosporium* See fungus
 - Clam juice as flavouring agent 735
 - Clostridium botulinum*
 - growth:
 - effect of nitrate 819
 - effect of sorbate 819
 - effect of potassium sorbate 820
 - spores: thermal resistance
 - effect of nitrate 819
 - effect of sorbate 819
 - Clouding agent, citrus juice 744
 - Cobalt chloride, water activity, effect of temperature 462
 - Cocoa
 - tyramine 755
 - Cocoa bean
 - (-)-epicatechin determination, HPLC 759
 - Cocoa beverage, composition 757
 - Cocoa moth, control by sexual attractants 792
 - Cocoa powder
 - polysaccharide determination 756
 - transport 430

- Coconut
chemical changes *during* aflatoxin production 609
- Cod, muscle, formaldehyde production effect of oxygen 725
- Coffee
roasting, aroma recovery 752
trigonelline determination, polarography 753
- Colocasia esculenta* See taro
- Colourant
dye determination, HPLC and calorimetry 513
resonance Raman spectroscopy 511
orange dye, determination, resonance Raman spectroscopy 511
phloxine teratogenicity 512
red dye determination, resonance Raman spectroscopy 511
yellow dye, determination resonance Raman spectroscopy 511
- Colourant degradation due to furfural 471
5-hydroxymethylfurfural 471
- Computer, dough rheology 524
- Confectionery, manufacture by extrusion cooking 650
- Cookie
dough 651
sugar cookie 651
wheat-navy bean -sesame seed based 652
- Copper intake in rats
effect of calcium 466
effect of phosphates 466
- Cottonseed
fattyacid composition 566
oil composition 566
- Cow
slaughter house 684
waste water treatment 684
- Cowpea
Callosobruchus maculatus control by vegetable oil 793
nutritional quality effect of infestation 557
- Crab
blue: colour changes *during* cooking 734
Egyptian: composition 732
storage, atmospheric 733
- Cryptococcus albidus* See yeast
- Cucumber
bloater formation 601
brined; gas diffusion 601
mineral oil coated: determination, GC 610
- Cucumber
parafin wax coated; determination, GC 610
slices, microbiological quality 602
- Custard
canned: microbiological evaluation by hydrophobic grid membrane filter method 666
- β -cyclodextrin
citrus juice, debittering 743
- Cyclohexylamine
sweetener toxicity 508
- Dairy waste, fermentation 609
- DDT residues, cereals and cereal products 522
- Dehydroacetic acid
squash, determination, GLC 738
wine, determination, GLC 738
- Dietary fiber
cereals, composition 520
effect of heat 806
- Dill pickle, acceptability 783
- 2,6-dimethylhept-5en-1-al, toxicity rats 814
- 2,5-dimethyl-4-methoxy-3(2H furanone, strawberry, determination, mass fragmentationography 614
- Dioscorea rotundata* See yam
- Disease
coeliac disease and cereal protein 518
- Dodecyl gallate, antimicrobial activity 498
- Dough conditioner 642
- Dyes See colourant
- Edible oil
analysis, colorimetry 765
antioxidants 707
- Egg
cooked: effect on
Salmonella typhimurium 711
Staphylococcus aureus 711
heat treated: effect on protein 709
pasteurization 707
pickled: quality;
effect of packaging material 708
effect of storage temperature 708
preservation by
CO₂ 715
liming 715
oiling 715
refrigeration 715
thermo stabilization 715
waxing 715

- Egg (contd.)
 - protein effect of heat 709
 - quality 716
 - Salmonella typhimurium* survival, effect of cooking 711
- Egg plant
 - mineral oil coated: determination, GC 610
 - parafin wax coated: determination, GC 610
- Egg powder, transport 430
- Egg shell
 - microbial contamination 714
 - structure, electron microscopy 713
- Egg shell membrane
 - iron binding properties 712
 - structure 712
- Egg white, amino acid analysis 802
- Egg yolk
 - lipoprotein gelation effect of sodium chloride 710
- Electrical stimulation beef muscle 685
- Electronics and food industry 459
- Electron microscopy
 - beef, microbiological evaluation 690
- Emballistics
 - isotherm and package life 444
- Emulsifiers, powdered 515
- Emulsion
 - oil-in-water emulsion refractive index 516
- Enterobacter* See bacteria
- Enterotoxin, sprouted bean 554
- Enzyme electrode for sugar and sugar product, determination 468
- Equipment
 - at Food Industries Engineering Exhibition 429
 - French Agro-Food Equipment Industry 458
- Erwinia herbicola* See bacteria
- Escherichia coli* See bacteria
- Essential oils 763
 - composition, determination apparatus 764
- Ethanol
 - citrus waste 617
 - beverages, determination enzyme electrode 468
 - food, determination, enzyme electrode 468
- Ethyl butanoate strawberry, determination mass fragmentography 614
- Ethyl hexanoate, strawberry, determination, mass fragmentography 614
- Ethylene oxide, chromosomal damage 809
- Extrusion cooking
 - biscuit 650
 - confectionery 650
 - maize, starch degradation 549
- Faba bean
 - protein
 - nutritive value 559
 - properties 558
- Falling film evaporator, heat transfer 445
- Fat
 - cereals, composition 519
 - lipolysis 768
- Fatty acid
 - effect on lipid metabolism 770
 - oils, determination, GLC 706
- Fermentation
 - GC, analysis 486
- Fermented vegetables
 - fatty acid composition 589
 - lipid composition 589
- Ferrous oligogalacturonate 637
- Field bean
 - plastein 560
 - protein 560
 - high protein curd preparation 556
- Fish
 - amine, determination, HPLC 477
 - hypoxanthine, determination by enzyme sensory specific 719
 - putrefied meal: amino acid composition 720
 - sterilization 718
- Fish meal
 - amino acid composition 720
- Flavours
 - encapsulated: application and development 509
 - research, GC use 510
- Flavour components
 - citrus 745
 - nira, determination, GC-MS 584
- Folic acid
 - food processing, degradation 441
 - food, thermal stability 467
- Food
 - canned: nutritional value 437
 - dulcin; determination, spectrophotometry 479
 - Dutch: pesticide residues 799

Food (Contd.)

- fat, determination, chloroform methanol extraction method 769
 - folic acid
 - degradation 441,762
 - thermal stability 467
 - freezing time, determination, analytical method 472
 - heavy metals, bibliography 808
 - ionization treatment process 428
 - irradiation 442
 - 5-methyltetrahydrofolic acid, thermal stability 467
 - microbiological evaluation 482,707
 - review 481
 - packaging and spoilage 446
 - packed: packaging material migration 453
 - polycyclic aromatic hydrocarbon, determination, HPLC 815
 - polymer and solute water differentiation, pulsed NMR 473
 - preparation 707
 - research 707
 - rheology 786,787
 - saccharin, determination, HPLC 476
 - shelflife, determination 790
 - spoilage and packaging 446
 - sugar determination by enzyme electrode 469
 - water activity, Raoult's Law application 464
- ## Food industry
- electronics 459
 - energy management 461
 - Robot application 460
- ## Food information *in* decision making
- 435
- ## Food products
- at* Food Industries Engineering Exhibition 429
 - solar drying 440
- ## Forestry and planning
- 431
- ## Formaldehyde production, *effect on* cod muscle
- 725
- ## *Fragaria xananassa* See strawberry
- ## Freezing, sweetened mango puree
- 621
- ## Frozen food, shelflife, determination
- 790
- ## Fructose
- antimicrobial activity 635
- ## Fruit concentrate
- dehydration, osmosis 737

Fruit juices

- dehydration, osmosis 737
- sensory property, determination 740
- sugar composition, determination, GLC 739

Fruits

- aflatoxin contaminated: chemical changes 609
- contamination 607
- enzymes 605
- EEC regulation 606
- fiber composition 582
- maturation 605
- organoleptic property 607
- packaging
- pectin composition 582
- processed
 - fiber composition 582
 - pectin composition 582
- quality 607
- regulation 607
 - EEC 606
- senescence 605
- solar drying 440
- toxicity 607

Fudge

- water activity, determination, *effect of* temperature 462

Fumigation

- methyl bromide vapour pressure characteristics 795
- phosphine distribution 798

Fungus

- bean, sprouted: aflatoxin production 554
- butylated hydroxyanisole toxicity 503
- butylated hydroxytoluene toxicity 503
- propyl gallate toxicity 503
- effect of*
 - butylated hydroxyanisole 499
 - sorbic acid 499
- tertiary butylhydroquinone toxicity 503

Furfural

- anthocyanin degradation 471

Fusarium See fungus

Ghee

- animal fat, determination, calorimetry 777

Glucose

- antimicrobial activity 635
- beverages, determination, enzyme electrode 468

- Glucose (contd.)
 food, determination, enzyme electrode 468
- Glucosinolate
 composition, determination 565
- Glutaraldehyde, toxicity 817
- Glutelin, cereals 521
- Gooseberry
 fiber composition 582
 pectin composition 582
- Grain, sampling technique 788
- Grape concentrate
 fiber composition 582
 pectin composition 582
- Grapefruit juice
 limonin debittering, β -cyclodextrin 743
 naringin debittering, β -cyclodextrin 743
- Grape juice
 colour stability effect of
 ascorbic acid 741
 storage 741
 Concord': colour effect of
 ascorbic acid 741
 storage 741
- Green bean
 fiber composition 582
 Pectin composition
- Groundnut oil
 autoxidation, effect of water activity 772
 cow pea: *Callosobruchus macculatus* infestation control 793
 Gundruk See mustard product
- Horse meat, differentiation 682
- HTST extruder, biochemical reactor 518
- Hydrogen peroxide treatment, whiting: mutagenicity: Ames test 726
- 5-Hydroxymethylfurfural, anthocyanin degradation 471
- Hygrometer, Vaisala Humicap electric hygrometer, water activity measurement 463
- Ice-cream, quality 675
- Information
 for decision makers 432
 food processing information for decision makers 436
 nutrient analysis information for decision makers 433
- Insecticide
 cowpea: *Callosobruchus macculatus* control 793
- Insecticidal activity
 vegetable oils: *Tribolium castaneum* control 794
- Ionizing treatment process of agro-food products 428
- Iron intake in rats
 effect of
 calcium 466
 phosphates 466
- Irradiation of food 442
- Jojoba wax, isomerization 776
- Kangaroo meat, differentiation 682
- Kapok
 fatty acid composition 566
 oil composition 566
- Karite oil, cowpea:
 Callosobruchus macculatus infestation control 793
- Kidney beans, canned: contamination reduction 451
- Kiwifruit
 chemical composition 607
 pesticide residues, determination 634
- Klebsiella pneumoniae* See bacteria
- Lactose
 beverages, determination, enzyme electrode 468
 food, determination, enzyme electrode 468
- Leafy vegetables, Nigerian: mineral composition 591
- Leavening agent, sodium aluminium phosphate toxicity 514
- Legume, water intake during soaking 552
- Lemonade, sweetness, determination 740
- Lemon juice
 fiber composition 582
 pectin composition 582
- Lemon peel
 bioflavonoid extract, determination, HPLC 616
- Lens culinaris* See lentil
- Lentil
 chymotrypsin inhibitor 501
 trypsin inhibitor 501
- Lime bean
 fiber composition 582
 pectin composition 582

- Lime juice
 - fiber composition 582
 - pectin composition 582
- Linalool
 - strawberry; determination, mass fragmentography 614
- Lineseed as ingredient bread 640
- Liquid packaging
 - developments 454
- Litchi, physico-chemical composition 632
- Lobaster, stored: discolouration 731
- Loganberry
 - fiber composition 582
 - pectin composition 582
- Lupine, safety evaluation 562
- Lupinus albus* See lupine
- Macaroni, alkylresorcinol composition 537
- Mackerel, antioxidants 727
- Maize
 - composition, effect of roasting 548
 - extrusion cooking; starch degradation 549
 - fiber composition 582
 - milling 546
 - pectin composition 582
 - roasting; effect on composition 548
 - starch degradation during extrusion cooking 549
 - transport 430
 - waxes 547
- Maize flour
 - 'Arepá'; traditional Venezuelan food: rheology 550
 - dietary fiber composition 520
- Maize oil, trace elements, determination, AAS 773
- Maize/soyabean/rice product
 - protein quality 570
 - nutritive value 570
 - storage stability 570
- Malvidin-3-glucoside, wine 761
- Mango puree
 - sweetened: preservation
 - by canning 621
 - by freezing 621
- Marine organisms
 - protein hydrolysis, determination 717
- Meat
 - Clostridium botulinum*, effect of
 - nitrite 819
 - sorbate 819
 - composition determination, NIR 678
 - flavour, sulphur composition 683
 - packaged: microbial:
 - effect of gas permeability of packaging film 677
 - effect of nitrite 677
 - quality control 679
 - shelflife, determination 790
 - Meat products
 - fat determination 681
- Melon
 - fiber composition 582
 - pectin composition 582
- Melon seed flour
 - Nigerian: composition 603
- Mercuric chloride
 - dysmorphogenicity 811
 - embryotoxicity 811
- Methane, citrus waste 617
- Methyl bromide
 - cans for packaging 795
 - vapour pressure characteristics 795
- Methyl mercury chloride
 - dysmorphogenicity 811
 - embryotoxicity 811
- 5-methyltetrahydrofolic acid, food, thermal stability 467
- Microbial α -glucosidase 485
- Microbiological evaluation
 - beef
 - electron microscopy 690
 - vacuum packaged 689
 - food 483
 - review 481
 - salads 482
 - sprouts 482
- Microorganisms, thermal injury 489
- Microwave cooking, effect on beef quality 694
- Milk
 - aflatoxin M₁, determination HPLC 668
 - buffalo milk
 - flavour, effect of packaging materials 665
 - packed: flavour changes 665
 - composition, determination, NIR 660
 - cow's milk
 - protein separation, chromatography 662
 - electrophoresis 663
 - pyrantel, determination, TLC 664

Milk (contd.)

- fat, determination 659
- lactose, determination 659
- lipolysis 661
- microbiological evaluation,
hydrophobic grid membrane filter
method 666
- psychrotrop growth
 - effect of *Lactobacillus lactis*
667
 - effect of potassium sorbate 667
- Milling technology 518
- Minerals in canned food 437
- Mineral oil coating,
 - fruits, determination, GC 610
 - vegetables, determination, GC 610
- Mucor See fungus
- Muscle protein 680
- Mushroom
 - aflatoxin production 494
 - canning medium: tomato juice 495
 - pleurotus*, new strains 493
- Musli composition 519
- Mustard product
 - amino acid composition 590
 - Japanese "Takana": fatty acid com-
position 589
 - lipid composition 589
 - Napalese "Gundruk":
 - fatty acid composition 589
 - lipid composition 589
- Mutton
 - electrically stimulated:
palatability 696
- Mycotoxin
 - cereals 523, 528
 - rice, contamination 528
- Neem oil
 - cow pea, *Callosobruchus maculatus*
control 795
- Nira, flavour constituents, determi-
nation, GC-MS 583
- Oat
 - composition 519
 - β -D-glucan, analysis by calcofluor
542
- Ochratoxin A
 - cereals, contaminated, effect on
broilers 523
 - distribution 818
- Octyl gallate, antimicrobial activity
498

Oils

- fatty acid, determination, GC 766
- Orange
 - aroma 745
 - bioflavonoid extract, determination,
HPLC 616
 - dried: antioxidant activity 620
 - essential oil 745
 - quinomethionate residues, determina-
tion, HPLC 629
- Orange dye See colourant
- Orange juice
 - Californian:
 - adulteration detection 749
 - characteristics 747
 - clouding agent 744
 - colour, determination 740
 - fiber composition 582
 - Italian: limonin 748
 - limonin 748
 - removal by β -cyclodextrin 743
 - naringin removal by β -cyclodextrin 743
 - pectin composition 582
 - pulpwash adulteration 747, 749
 - sensory properties 740
 - Orange juice concentrate, Californian:
 - adulteration detection 749
- Orange product
 - spray dried: quality 619
- Orange pulpwash
 - Californian:
 - adulteration detection 749
 - characteristics 747
- Oxidation, effect on carp myofibrillar
protein 724
- Packaging
 - advances in emballistics 444
 - liquid packaging developments 454
- Packaging materials
 - aluminium foil 447-8
 - effect on buffalo milk 666
 - effect on pickled egg quality 708
 - migration in packed food 453
- Paka
 - fatty acid composition, determination
566
 - oil composition 566
- Palm oil
 - cowpea: *Callosobruchus maculatus*
control 793
- Papain
 - immobilization by parafin wax 630

- Papaya nectar
 - fiber composition 582
 - pectin composition 582
- Paperboard
 - pasta packaging: water vapour permeability 657
- Parafin wax coating
 - fruits: determination, GC 610
 - vegetables: determination GC 610
- Pasta
 - cooking 656
 - packaged: water vapour permeability 657
 - quality 656
 - starch composition 656
 - stored: protein quality 658
- Pea
 - "Alaska" and "Garfield": canned; quality effect of
 - blanching 555
 - brining 555
 - cultivars 555
 - soaking 555
 - fiber composition 582
- Pea flour, amino acid, determination 802
- Peach
 - kernel: sugar composition 622
 - serotonin composition: determination, spectrometry and TLC 612
 - shell: sugar composition 622
- Pear juice
 - canning
 - aluminium kilned cast steel 450
 - ingot cast steel 450
 - silicon-kilned cast steel 450
- Pearl millet
 - roti* preparation 542
- Pectic polysaccharide cabbage 595
- Pectin
 - fruits 582,623
 - plum 623
 - separation, ion exchange chromatography 611
- Pepper
 - black pepper:
 - oleoresin 782
 - packaged: quality 781
 - blackening during dehydration 780
- Pesticide
 - availability 800
 - application 800
 - cereals 518
 - demand 800
- Pesticide residues, Dutch food 799
- Phloxine B See colourant
- Phosphates effect on
 - copper intake in rats 466
 - iron intake in rats 466
 - zinc intake in rats 466
- Phosphine, fumigated material, distribution 798
- Pichia membranaefaciens* See yeast
- Piper nigrum* See pepper
- Planning, role of forestry 431
- Plantain
 - composition 600
 - physiological changes 600
- Plant tissue, chromium, determination, AAS 478
- Pleurotus* See mushroom
- Plum
 - pectin composition 623
 - serotonin composition, determination, spectrofluorimetry and TLC 612
- Polyethylene
 - pasta packaging : water vapour permeability 657
- Polygalacturonase differentiation 638
- Polypropylene, pasta packaging: water vapour permeability 657
- Polyhydroxy chalcone See antioxidants 767
- Pork
 - differentiation 682
 - fat determination, NIR 697
 - moisture determination, NIR 697
 - protein determination, NIR 697
- Potassium bromide
 - water activity determination 462
- Potassium sorbate
 - effect on yeast 500
- Potato
 - glycoalkaloid determination 584
 - glycoalkaloid in human plasma, radioimmunoassay 585
 - post-harvest loss 518
 - starch manufacture 518
- Potato processing 518
- Potato products, dehydrated: glycoalkaloid determination 584
- Poultry
 - amino acid, determination 698
 - bologna effect of
 - chopping 700
 - meat type 700
 - nitrite 701
 - calcium determination, titrimetry 699

- Poultry (contd.)
 purine determination 698
 shelflife determination 790
Poultry Product
 comminution 707
 flaking 701
Poultry waste, biogas production 703
Preservatives
 dehydroacetic acid
 squash, determination, GLC 738
 wine, determination, GLC 738
 effect on fungus 499
 effect on yeast 500
Preserve
 water activity determination,
 effect of temperature 462
Processed food
 microbiological evaluation 483
 serotonin composition, determination, spectrofluorimetry and TLC 612
Prolamine, cereals 521
Propyl gallate
 antimicrobial activity 498
 antifungal activity 503
Protein
 cereal composition 519
 citrus waste 617
 foaming 469
 hydrophobicity 469
 properties 564
 water absorption, determination 465
Prothiophos residue
 cabbage, determination, GC-MS 596
Pseudomonas fluorescens See bacteria
Pseudomonas fragi See bacteria
Psychotoxicity
 sodium nitrite 501
Pulse NMR spectroscopy, food technology 470
Pumpkin as ingredient for bread
Pyrantel
 cow's milk, determination, TLC 664
Pyrethroid
 detection and separation TLC 796
 determination GLC 797

Quinomethionate residue, apple, determination HPLC 629
 orange, determination, HPLC 629

Rainbow trout
 aflatoxin B₁ mutagenicity 723
 aflatoxin M₁ mutagenicity 723

Raoult's Law application, food, water activity 464
Rapeseed concentrate
 amino acid determination 802
Rapeseed meal 707
 glucosinolate degradation, microbial 567
Raspberry
 'Red':
 fiber composition 582
 pectin composition 582
Raw material
 bulk transport 430
Red dyes See colourant
Red pepper, yield and weight: effect of chlorflurenol 599
Retort pouch processing heat transfer 455
Rheology
 dough, evaluation, computer application 524
Rhodotorula glutinis See yeast
Rhodotorula rubra See yeast
Rhizopertha dominica wheat, infested: separation by sieve 535
Rice
 composition 519
 desorption isotherms 527
 drying 526
 mycotoxin contamination 528
 transport 430
Rice flour
 dietary fiber composition 520
Rice/Maize/Soyabean product
 protein quality 570
 nutritive value 570
 storage stability 570
Robot application in food industry 460
Rockfish, pacific: species identification 729
Rotis based on pearl millet, preparation 543
Rye, yeast isolation 525
Rye dough, electron microscopic study 541
Rye flour
 dietary fiber composition 520
 yeast isolation 525

Saccharin, food, determination HPLC 476
Saccharomyces cerevisiae See yeast
Salad, microbiological evaluation 482
Salmo gairdneri See rainbow trout
Sardine, canned: glucose level 722

- Seasoning, spices 778
- Sensory evaluation
 - fruit juices 740
 - taste and consistency 784
- Sensory panel
 - procedure and establishment 785
- Serotonin
 - fruits: composition, determination, spectrofluorimetry and TLC 612
 - vegetables: composition, determination, spectrofluorimetry and TLC 612
- Sheep, meat differentiation 682
- Shrimp, canned: texture 736
- Silicon-kilned cast steel cans
 - food 450
 - pear juice 450
 - tomato concentrate 450
 - vegetables 450
- Single cell protein
 - from cellulose by *Aspergillus terreus* 492
 - cheese 674
- Snack food
 - fish based 439
 - meat based 439
 - salt composition 646
 - shelflife 439
- Sodium aluminium phosphate as leavening agent, toxicity 514
- Sodium benzoate, effect on yeast 500
- Sodium bromide, water activity, determination 402
- Sodium chloride
 - egg yolk, protein gelation 710
- Sodium nitrite, toxicity to rats 501
- Solanidine
 - potato glycoalkaloid product in human plasma, radioimmunoassay 586
- Solar drying
 - fruits 440
 - vegetables 440
- Sorbic acid, effect on yeast 500
- Sorghum
 - colour 544
 - cooking 544
 - milling 544
 - protein,
 - composition and ultrastructure 545
- Sorghum flour
 - dietary fiber composition 520
- Sour cherry
 - fiber composition 582
 - pectin composition 582
- Soyabean
 - quality, effect of
 - radiation 568
 - storage 568
- Soyabean/maize/rice products
 - protein quality 570
 - nutritive value 570
 - storage stability 570
- Soyabean oil
 - composition, genetic alteration 775
 - degumming 774
 - stability 774
- Soy protein, amino acid, determination 802
- soy protein - lipid film 569
- Spices
 - flavours, production and use 779
 - seasoning 778
- Spinach
 - fiber composition 582
 - pectin composition 582
- Sprout
 - microbiological evaluation 482
- Squash
 - fiber composition 582
 - dehydroacetic acid, determination, GLC 738
 - mineral oil coated: determination, GC 610
 - parafin wax coated: determination, GC 610
 - pectin composition 582
- Starch
 - baking industry; enzymatic saccharification 645
- Sterilization, heat sterilization; temperature measurement 456
- Storage shed, heat transfer 789
- Strawberry
 - aroma determination, mass fragmentography 614
 - fiber composition 582
 - pectin composition 582
 - sensory property 614
 - volatile acid determination, by steam distillation method 613
- Streptococcus faecalis* See bacteria
- Sucrose
 - beverages, determination, enzyme electrode 468
 - food, determination, enzyme electrode 468
 - freeze dried: browning 636
- Sugar
 - fruit juices, determination, GLC 739
 - tomato juice, composition 739
 - lemonades, composition 739

- Sugar (contd.)
transport 430
- Sweetener
acesulfame K 505
aspartame
analysis, chromatography 506
browning 475
cyclohexylamine toxicity 508
food, safety and regulation
saccharin toxicity 508
talin protein 502
- Sweet potato
fiber composition 582
mineral oil coated; determination,
GC 610
paraffin wax coated; determination,
GC 610
protein composition 582
storage, phosphoric acid addition
586
- Sweet potato puree
stored: amino acid composition,
determination 586
- Takana See mustard product
- Talin protein See sweetener
- Tangerine concentrate
fiber composition 582
pectin composition 582
- Tannin, determination 480
- Taro, Papua New Guinean: nutritive
value 587
- Technological information for decision
making 432
- Tejpat oil 763
- Temperature measurement, heat
sterilization 456
- Teratogenicity, phloxine B in mice
512
- Tertiary butylhydroquinone, antifungal
effect 503
- Thiamine, interaction with reducing
sugar 804
- Tinplate, Indian; quality 449
- Tinplate can
canned food; contamination 451
welded: quality 452
- Tomato
enzyme determination, electrophore-
tic 598
hybrids: quality 597
serotonin composition, determina-
tion, spectrofluorimetry and TLC
612
- Tomato concentrate, canning using
aluminium-kilned cast steel 450
ingot cast steel 450
silicon-kilned cast steel 450
- Tomato juice
mushroom canning medium 495
processing, folic acid degradation
495
sugar composition, determination,
GLC 739
- Tomato paste, canned, contamination 451
- Torulopsis ingeniosa* See yeast
- Trace elements, methylation reaction 807
- Traditional food; Venezuelan: Arepa;
from maize flour, rheology 550
- Trans-2-hexenal composition, strawberry,
determination, mass fragmentography 614
- Transport
cocoa powder 430
egg powder 430
maize 430
rice 430
rusk fragments 430
sugar 430
wheat 430
yeast 430
- Tribolium castaneum*
oil insecticidal activity 794
wheat infested; separation by sieve
555
- Trichoderma* See fungus
- Trichosporon cutaneum* See yeast
- Triglyceride, synthesis and separation
771
- Triticale
composition 529-30
mineral composition 530
processing 529-30
quality 529-30
- Tryptophan degradation, heat treatment
805
- Tuna
amine determination, HPLC 477
canned: high vacuum flame steriliza-
tion 728
high vacuum flame sterilization 728
- Turkey
bologna, effect of nitrite 701
breast: shelflife; effect of vacuum
packaging 706
breast; vacuum packaging; effect on
shelflife 706
- Turkey egg shell, microbial contamina-
tion 714

- Turnip
 mineral oil coated: determination,
 GC 610
 parafin wax coated: determination,
 GC 610
- Urena lobata* See paka
- Vegetable oil
 cowpea: *Callosobruchus maculatus*
 control 793
- Vegetables
 fiber composition 582
 pectin composition 582
 solar drying 440
- Vicia faba* See faba bean
- Vigna unguiculata* See cowpea
- Waste management information for
 decision making 434
- Water activity
 measurement using Vaisala
 Humicap Electric Hygrometer 463
 Raoult's law application 464
- Wheat
 alkylresorcinol composition 537
 amino acid, effect of baking 534
 composition 519
 insect separation by sieve 535
 karnal bunt infected: toxicity 536
 gluten
 fatty acid composition 533
 molecular weight 533
 properties 532
 milling 518
 quality 518
 semolina, alkylresorcinol compo-
 sition 537
 transport 430
 variety identification 531
 yeast isolation 525
- Wheat bran
 alkylresorcinol composition 537
- Wheat dough
 composition, effect of additives
 518
 electron microscopic study 539,
 541
 sunflower protein properties 540
- Wheat flour
 alkylresorcinol composition 537
 amino acid determination 802
 dietary fiber composition 520
 glutenin, baking quality 518
- Wheat flour (contd.)
 moisture determination, microwave-
 oven method 538
 yeast isolation 525
- Wheat-navy bean - sesame seed based
 cookie 652
- Wheat-rye dough
 electronmicroscopic study 541
- Whey permeate
 citric acid production by fermenta-
 tion 671
- Whitening agent
 calcofluor; oat- β -D glucan analysis
 542
- Whiting
 hydrogen peroxide treated: mutageni-
 city, Ames test 726
- Wine
 chloride determination 759
 citrus waste 617
 dehydroacetic acid determination,
 GLC 738
 Malvidin-3-glucoside 761
 tyramine composition 760
- Winged bean curd
 preparation and properties 563
- Winter squash
 fiber composition 582
 pectin composition 582
- Yam, stored: biochemical changes 588
- Yeast
 baker's: manufacture 488
 cereals and cereal product, isolation
 525
 dough; α -amylase activity 641
 α -glucosidase 485
 rapeseed meal, glucosinolate degra-
 dation 567
 thermal injury 489
 transport 430
- Yellow dye See colourant
- Yoghurt
 sucrose sweetness estimation 670
- Zea mays* See maize
- Zinc intake in rats
 effect of
 calcium 466
 phosphates 466
- Zizyphus mauritiana* See ber

I N D E X

- Acetum indicum* See prawn
Aflatoxin
 Aspergillus effect of carrot seed oil 938
 cheddar cheese, effect of temperature 1022
 determination 1154
 determination, coupled column system 1157
 effect on industrial workers 1158
 mutagenicity effect of yeast 1156
 rice, effect of temperature 1022
Agar jelly 986
Agricultural products
 aflatoxin determination 1154
Alcohol production from maize, captan-treated 885
Alfalfa tablet, coumestrol determination, HPLC 947
Almond
 composition 927
 phenolic acids, determination, GLC-MS 926
Almond butter (use in) bakery products 928
American patent system 822
Amine
 wine, biogenic amine determination, chromatography 1106
Amino acids
 analysis, fluorometry 1135
Ammonia
 seafoods, determination, enzymatic method 1070
 α -amylase, barley, separation 895
 β -amylase, cereals, determination 862
 β -amylase, sorghum 893
Amyloglucosidase See glucosidase
Antimicrobial agent
 sodium bisulphite, potato preservation 939
Antifungal activity
 garlic 932
 lime oil 965
 onion 932
 orange oil 965
Antifungal agent effect on *Aspergillus* growth 851
Antioxidant, arginine-xylose Maillard reaction product activity 837
Apple
 dietary fiber, determination, HPLC 1132
 ethylene production 972
 storage 972
Apple juice
 Argentinian 1096
Apricot dehydration 955
Arginine-xylose Maillard reaction product, antioxidant activity 837
Aroma volatile components watercress, determination, GC 950
Aseptic canning 833
Aseptic filling 833
Aseptic filling equipment 833
Aseptic packaging See packaging, aseptic
Aseptic sealing equipment 833
Aseptic thermoform 833
Asparagus canned, nisin as additive 849
***Aspergillus* (See also aflatoxin)**
 growth and aflatoxin production, effect of carrot seed oil 938
 lime oil antifungal activity 965
 orange oil antifungal activity 965
Aspergillus flavus
 strain identification 1155
 growth, effect of antifungal agents 851
 growth, effect of pH 851
 growth, effect of temperature 851
 growth, effect of water activity 851
 rice and cheddar cheese, effect of temperature 1022
***Aspergillus niger* amyloglucosidase** 848
***Aspergillus parasiticus* growth**
 effect of antifungal agents 851
 effect of pH 851
 effect of temperature 851
 effect of water activity 851
Aspergillus parasiticus, rice and cheddar cheese, effect of temperature 1022
Avocado, Venezuelan 971
Bacon
 fried, *N*-nitrosopyrrolidine formation 1059
 fried, temperature profile 1058
***Bacillus cereus* toxin production**, food 1150
Bajra, microbial toxin production 1150
Bakery products, almond butter use 928

- Bamboo shoots
 - composition 942
- Barley
 - α -amylase separation 895
 - kernel lysine 897
 - starch 896
- Bean
 - composition 954
 - pesticide residue determination, colorimetry 944
- Beef
 - Angus
 - cooking loss 1038
 - flavour 1038
 - juiciness 1038
 - tenderness 1038
 - aroma volatiles 1045
 - bullock's muscle characteristics 1037
 - carcass, chilling, microbial quality 1043
 - carcass composition 1039
 - carcass, microbial quality 1043
 - characteristics 1036
 - colour, effect of pressurization 1041
 - confective heat processing, nutrient retention 1054
 - corned buffalo meat 1046
 - ground, acidified, microbial growth 1040
 - ground, microbial growth 1040
 - Holstein's,
 - cooking loss 1038
 - flavour 1038
 - juiciness 1038
 - tenderness 1038
 - infrared processing, nutrient retention 1054
 - microbial growth, effect of electrical stimulation 1042
 - microbial growth, effect of pressurization 1041
 - muscle characteristics 1037
 - odour, effect of pressurization 1041
 - patties, fatty acids 1032
 - patties, effect of packaging 1032
 - patties, effect of storage 1032
 - steer's muscle characteristics 1037
 - thermal properties 1035
- Beetroot slice, extraction 935
- Beetroot powder pigment
 - stability, effect on water activity 936
- Bell pepper, fermented, storage stability 945
- Bendiocarb residue, maize, determination, GC 886
- Bengal gram, hypocholesterolemic effect 900
- Benzo(a)pyrene
 - effect of dietary fiber 1131
 - mutagenicity, effect of lignin 841
 - pectin 841
- Beverages (See also coffee, tea)
 - consumption 1089
 - production 1089
- Biogas from papaya waste 974
- Biological control of pests
 - Bacillus* 1126
 - plants 1128
- Biscuit
 - chocolate enrobing 958
 - fructose corn syrup use 991
- Black gram
 - hypocholesterolemic effect 900
 - mineral composition 898
- Blue crab See crab
- Bologna, microbial growth control
 - effect of additives 1048
- Bovine collagen
 - age related changes 1034
 - chemical composition 1034
- Bovine muscle, emulsifying capacity 1033
- Bread
 - fructose corn syrup use 991
 - microbial toxin production 1150
- Brine driven evaporator See evaporator
- Broad bean
 - amino acid composition 903
 - 'Gemini': composition 903
 - 'Korunde': composition 903
 - 'Locale di Putignano': composition 903
 - protein composition 903
 - 'Supersimonia'; composition 903
- Broiler
 - chilling, effect on
 - chloride ion concentration 1065
 - moisture 1065
 - tenderness 1065
 - chloride ion concentration 1065
 - moisture level 1065
 - tenderness 1065
- Bubalus bubalis* See buffalo
- Buffalo meat
 - canned corned buff 1046
 - characteristics 1036

- Butter, flavouring 1005
Butternut, phenolic acids determination, GLC-MS 926
- Cabbage
composition 954
pesticide residue determination, calorimetry 944
- Cadmium
groundnut, determination 948-9
sweet corn, determination 948
vegetables, determination 948-9
- Caffeine 1098-9
behavioural effects 1101
- Cajanus cajan* See pigeon pea
- Cake, fructose corn syrup use 991
- Calcium
dairy products, effect on *Lactobacillus* 1004
food, composition, effect of processing 823
- Callinectes sapidus* See blue crab
- Campylobacter jejuni*, lamb meat 1050
- Canned corned buff 1046
- Canning
fruits and vegetables using OTS cans 832
- Cans
open top sanitary cans, canning of fruits and vegetables 832
evaluation 832
- Captan treated maize for alcohol production 885
- Carbaryl residue, vegetables, determination, calorimetry 944
- Carbohydrates
mungbean sprouts, effect of blanching 908
processing 908
storage 908
- β -carotene, dried food, decolourization 839
- Carotenoid, orange oil, composition 967
- Carrot
blanched, enzymic activity 938
blanched, quality 938
fermented, storage stability 948
mineral composition effect of processing 823
- Carrot seed oil, effect on *Aspergillus* aflatoxin production 938
- Carya* See hickory nut
- Casein, phosphorylation 1016
- Cassava, fermented, odour compounds 941
- Cauliflower
mineral composition, effect of processing 823
peroxidases 951
- Cell culture method, toxicity testing 1147
- Cereal dietary fibre, composition 954
- Cereals (See also oat, rice, rye, wheat)
 α -amylase determination 862
vomitoxin residues 863
- Chapati
effect of emulsifiers 872
effect of soy flour 872
- Cheese
Aspergillus toxin production, effect of temperature 1022
Cheddar, *Aspergillus* toxin production, effect of temperature 1022
flavouring 1005
Mozzarella, texture 1023
nisin as additive 849
Staphylococcus growth 1024
- Cherries
canned and pouched
colour 909
texture 909
vitamin 909
dehydration 955
- Chestnut
American and Chinese, phenolic acids, determination, GLC-MS 926
- Chicken
fat, malonaldehyde, thiobarbituric acid test 1062
microbial growth effect of irradiation 1064
volatile flavour compounds 1063
- Chick pea, phenolic acids composition 899
- Child nutrition, Bangladesh 1141
- Chilli
Capsaicinoid determination HPLC 1121
sauce, ascorbic acid 1120
beef carcass, microbial quality 1043
- Chocolate 987
- Chocolate enrobing of biscuits 988
- Cholesterol, effect of protein 1143
- Chymotrypsin, winged bean, stability 913
- Citrus juice, oxygen measurement 1092
- Citrus paradisi* See grapefruit
- Clostridium botulinum* growth,
chicken, effect of irradiation 1064
frankfurter, effect of potassium sorbate 1044
sodium nitrite 1044

- Clostridium perfringens*
 food poisoning 1151
 lamb meat 1050
Clostridium sporogenes growth control,
 bologna, effect of additives 1048
Clover, composition 954
Cocoa, theobromine determination, HPLC
 1100
Cocoabean, moisture content 1097
Coconut, lipids 929
Coconut flour, defatted, phenolic
 acids composition 914
Cod
 dielectric properties 1073
 spoilage 1077
 stored, phospholipids 1075
Coffee, caffeine determination, HPLC
 1100
Confectionery using
 candied orange peel 968
 grapefruit peel 968
Confectionery plant, cleaning 980
Cookie See biscuit
Cooking
 'Soul foods' effect on microorga-
 nisms
 effect on *Trichinella spiralis* 1153
Cooking quality
 maize 891
 sorghum 891
Corn See maize
Corylus maxima See filbert
Cottonseed, gossypol removal by
 γ -radiation 915
Cottonseed flour, defatted, phenolic
 acids composition 914
Cottonseed oil, potato frying, 1-
 decyne formation 1116
Coumestrol, alfalfa tablet, determi-
 nation 947
Cow pea
 cooking quality improvement 904
 phenolic acids composition 899
Crab
 ammonia determination, enzymatic
 method 1070
 proteins 1082
 urea determination, enzymatic
 method 1070
Crest, ingredients from dairy crest
 981
Cryptolestes ferrugineus growth, stored
 wheat 878
Cucumber, fermented, storage stability
 945
Curd, tension measurement 1018
Cuttlefish, marketing in India 1078
Cysteine, pear juice concentrate,
 browning inhibition 1095
Dairy crest, ingredients (of) 981
Dairy industry 1006
Dairy products
 flavourings 1005
 freezing, *Lactobacillus* survival 1004
 iodine composition 1008
 Lactobacillus, effect of calcium 1004
Daucus carota See carrot
Deacidification, grape must, (by)
 Schizosaccharomyces pombe 1104
Decolourization, dried food -caro-
 tene 839
Dehydration, fruits 955
Desserts (milk based) flavouring 1005
Dietary fibre
 effect of benzo(a)pyrene 1131
 cereal, composition 954
 food, determination HPLC 1132
Dogfish
 stored, quality 1074
Doryteuthis singhalensis See squid
Dough, mixing, effect of pH 864
Dried food, β -carotene decolourization
 839
Drying
 (by) biogas (from) papaya waste 974
 solar biogas system 974
 'Sultana' grapes (using) alkaline
 emulsion 961
Egg
 processed, composition 1069
 processed, sensory property 1069
 scrambled, composition 1069
Electrical stimulation
 beef, effect on microbial growth 1042
 mutton tenderization 1049
Electroconductive thawing, frozen food
 824
Emulsifier
 sucrose ester emulsifiers, effect on
 chapati 872
Emulsification (of) beef muscle protein
 1033
Energy
 exergy balance for evaluation 835
 solar energy (for) rural areas 836
Energy conservation, turkey, process-
 ing 1060

- Equipment, aseptic filling and sealing 833
- Escherichia coli* shellfish 1077
- Ethanol
- yeast growth inhibition 1105
- Etropus suratensis* See pearl spot
- Evaporation (brine induced)
- evaluation 831
 - orange juice 831
 - skim milk 831
 - sugar solution 831
- Evaporator
- evaluation 831
- Exergy balance, energy, evaluation 835
- Faba bean
- phenolic acids composition 899
- Fatty acid
- beef patties 1032
 - determination, GC 1111
 - monoglycerides 1112
- Fenugreek, protein 1122
- Fermentation
- green bean, *Lactobacillus* 911
 - green bean juice, *Lactobacillus* 910
- Fermented
- cassava, odour compounds 941
 - vegetables, storage stability 945
- Field pea, phenolic acids composition 899
- Filbert, phenolic acids, determination, GLC-MS 926
- Fish
- frozen, dielectric properties 1073
 - frozen, spoilage 1073
 - sodium, determination 1071
- Flame sterilization, heat exchanger, liquid food, 826
- Flavour
- meat 1029
 - pineapple 959
- Flavoured drink
- strawberry, colour 958
 - sweetness 958
- Flavourings (See also spices, sweeteners)
- chicken, fried 1063
 - dairy products 1005
 - ice-cream 1026
 - savoury 1029
- Flax See linseed
- Fondant 982-3
- Food
- colour and sensory judgement 1124
 - freezing 834
 - glucose determination 975
 - heat exchanger 825
 - heat exchanger, flame sterilization 826
 - metal toxicity 1133
 - microbial toxin production 1150
 - mineral composition, effect of processing 823
 - processing, effect on minerals 823
 - sodium content 1130
 - 'soul foods' microorganisms, effect of cooking 828
 - vitamin B determination 1136
 - water activity, measurement 838
- Food and Drug Administration Standards 843
- Food consumption 1140
- adolescent 1142
 - children 1142
- Food poisoning, microbial 1151
- Food safety, microbiological criteria 1149
- Frankfurter, microbial growth, effect of
- potassium sorbate 1044
 - sodium nitrite 1044
- Freezing
- dairy products. *Lactobacillus* survival 1004
 - food 834
- Frozen fish See fish
- Frozen food (See also ice-cream)
- electroconductive thawing 824
- Fruit juices (See also apple juice, citrus juice, grape juice, tomato juice)
- consumption 1089
 - milk fortification 1086
 - production 1089
- Fruits
- composition 954
 - dehydration 955
 - disinfestation (by) radiation 956
 - quality and radiation 956
- Fudge 984
- Fungus
- Microsporium gypseum*, onion and garlic antifungal activity 932
 - effect of sorghum phenolic acids 888

Fusarium

- lime oil antifungal activity 965
- orange oil antifungal activity 965

Galactose

- milk, determination, HPLC 1010

Garlic

- antifungal activity 932

Glucose,

- food, determination 975
- maize (based) materials, determination 883
- milk, determination, HPLC 1010
- yeast growth inhibition 1105

Glucosidase, amyloglucosidase,
Aspergillus niger 848

Grape

- analysis 962
- desiccation
 - effect of package liner 964
 - effect of sulphur dioxide 964
 - effect of temperature 964
- effect of package liner 964
- salicyclic acid determination, spectrofluorometry 963
- spoilage
 - effect of package liner 964
 - effect of sulphur dioxide 964
 - effect of temperature 964
- effect of sulphur dioxide 964
- 'Sultana' drying (using) alkaline emulsion 961
- effect of temperature 964

Grapefruit

- chilling injury prevention 966
- storage temperature 966

Grape juice

- stored,
 - acidity 1091
 - colour stability 1091
 - pH 1091

Grape must

- deacidification (by) *Schizosaccharomyces pombe* 1104

Grapevine irrigation, wine quality 1107

Green bean

- canned mineral composition
- effect of processing 823
- canned and pouched:
 - colour 909
 - texture 909
 - vitamin 909
- fermented, storage stability 945
- fermented, by *Lactobacillus* stability 912

Green bean (contd.)

- fermented, mannitol stability 912
- fermentation by *Lactobacillus* 911
- frozen, mineral composition effect of processing 823

Green bean juice

- fermentation, by *Lactobacillus* 910

Green gram

- hypocholesterolemic effect 900
- mineral composition 898

Groundnut

- composition, determination 948
- flavour, roasted 930
- mineral composition, determination 949
- roasted, flavour volatiles 930

Groundnut flour

- defatted, phenolic acids composition 914

Groundnut meal

- aflatoxin determination, coupled column system 1157

Gums 985-6

Haddock

- dielectric properties 1073
- spoilage 1073

Ham, canned, nisin as additive 849

Hamburger, heat processed, nutrient composition 829

Harricot bean

- tannin composition, determination 905
- tannin and protein quality 905

Heat exchanger

- food system 825
- liquid food, flame sterilization 826
- sterilization 827

Heat transfer

- steam/air mixtures, evaluation 830

Hickory nut, phenolic acids, determination, GLC-MS 929

Honey

- flavour 979
- phenol residue, determination 977
- sulphathiazole residues, determination, LC 978
- volatile components 979

Human milk

- vitamin composition
- effect of processing 1011
- effect of storage 1011

Hypocholesterolemic effect

- legumes 900
- protein 1143

- Ice-cream
 - flavourings 1005,1026
- Indian sweet
 - Sohan papri
 - packaging 989
 - storage 989
- Indole (in) stored shrimp 1081
- Infant food, microbial toxin production 1150
- Infrared processing, food, nutrient loss 829
- Insect infestation (of) fruit,
 - effect of radiation 956
- Instant yeast See yeast
- Instron tester, rice stickness, determination 866-7
- Iodine, dairy products 1007
- Irradiation
 - chicken, effect on microbial growth 1064
 - effect on sorghum 890
- Jelly 985-6
 - agar jelly 986
- Kaun (Akanwu), cow pea cooking quality improvement 904
- Kintoki bean
 - trypsin inhibitor, heat inactivation 906
 - trypsin inhibitors, purification 906
- Lactobacillus*
 - genetic heterogeneity 844
 - green bean fermentation 911
 - green bean juice fermentation 910
 - stored scallop spoilage 1083
- Lactobacillus bulgaricus*
 - dairy products, effect of calcium 1004
 - dairy products, freezing, survival 1004
- Lactic acid
 - bologna, microbial growth control 1048
- Lactose, milk, determination, HPLC 1010
- Lamb (See also mutton)
 - lions, packaging 1052
 - mechanically deboned meat, microbial quality 1050
- Lead
 - groundnut, composition, determination 948-9
- Lead (contd.)
 - sweet corn, composition, determination 948-9
 - toxicity, effect of phosphate 1146
 - vegetables composition, determination 948-9
 - wheat, composition, determination 948-9
- Legumes
 - canned, nisin as additive
 - hypocholesterolemic effect 900
 - phenolic acids composition 899
- Lens culinaris* See lentil
- Lentil
 - hypocholesterolemic effect 900
 - phenolic acids composition 899
- Lettuce
 - composition 954
 - composition, determination, 948
 - mineral composition, determination, AAS 943
 - mineral composition, determination 949
- Lignin
 - antimutagenic activity 841
- Lilium maximoroviczii* See lily
- Lily
 - starch
 - amylopectin composition 934
 - amylose composition 934
 - properties 934
- Lima bean, phenolic acids composition 899
- Lime oil, antifungal activity 965
- Limonin, orange juice, solubility 1093
- Linseed flour
 - defatted, phenolic acids composition 914
- Lipase, *Pseudomonas fluorescens* 845-6
- Lipids,
 - coconut 929
 - potato chips, oxidation 940
- Liquid food, heat exchanger, flame sterilization 826
- Lizu corsula* See mullet
- Loligo duvauceli* See squid
- Low temperature luminescence spectroscopy
 - conduction cooling 842
 - pulsed source 842
- Lucerne composition 954
- Lupinus* See lupin
- Lysine, barley kernel 897
- Mackerel, protein, effect of *Pseudomonas marinoglutinosa* protease 1072
- Maillard reaction product, antioxidative assay 837

Maize

- captan-treated, alcohol production 885
- cooking quality 891
- endosperm protein 880
- mineral composition, effect of processing 823
- pesticide residue, determination, GC 886
- protein of endosperm 880
- protein, polymorphism 884
- starch 881
- tortilla 891

Maize (based) Products

- glucose determination 883

Maize meal, aflatoxin determination coupled-column system 1157

Malathion, wheat, stored, degradation 876

Malonaldehyde, chicken fat, thiobarbituric acid test 1062

Malting

- sorghum, polyphenolic changes 892
- sorghum, effect of tannin 892

Mandarin oil 969

Mango

- 'Dashehari', volatile components 970

Mango ginger

- aroma 1123
- essential oil 1123

Mango juice, canning (using) OTS cans 832

Mango pulp

- canning (using) OTS cans 832

Manihot esculanta See cassava

Meat

- cooking, *Trichinella spiralis* destruction 1153
- corned buffalo meat 1046
- determination, video image method 1030
- flavourings use 1029
- mechanically recovered meat
 - bone separation 1028
 - legislation 1028
 - processing 1028
 - storage 1028
- protein extraction 1031

Meat product

- bologna, microbial growth, effect of additives 1048
- frankfurter, microbial growth, effect of
 - potassium sorbate 1049
 - sodium nitrite 1044

Mechanically deboned meat, lamb meat, microbial quality 1050

Membrane reactor, soy protein hydrolysis 923

Mesquite bean

- chemical properties 907
- composition 907
- nutritive value 907

Metals (in) food, toxicity 1133

3-Methyl cholanthrene mutagenicity effect of

- lignin 841
- pectin 841

N-Methyl N-nitro-N-nitrosoguanidine mutagenicity

- effect of
 - lignin 841
 - pectin 841

Microwave cooking

- pork, effect on *Trichinella spiralis* infection
- turkey, energy consumption 1066

Milk

- Californian: iodine composition 1008
- fatty acids 1009
- flavourings 1005
- fruit juices, fortification 1086
- galactose, determination, HPLC 1010
- glucose, determination, HPLC 1010
- iodine 1007
- iodine composition 1008
- lactose, determination, HPLC 1010
- microbiological quality 1014
- nisin as additive 849
- quality control indicator 1013
- soft drinks, fortification 1086
- time-temperature indicator for quality control 1013
- vitamin composition, effect of processing 1008
- effect of storage 1008

Milk fat

- structure 1012

Milking equipment

- low-temperature cleaning 1014

Milk powder

- protein quality 1017

Milk pudding

- nisin as additive 849

Milling

- wheat 870
- wheat, for bakery products 869

Minerals

- food, composition, effect of processing 823

Minerals (contd.)

- groundnut, composition, determination 949
- lettuce, composition, determination 949
- potato, composition, determination 949
- pulses, composition 898
- soyabean, composition, determination 949
- sweet corn, composition, determination 949
- wheat, composition, determination 949
- Mullet
 - stored
 - quality 1076
 - shelflife 1076
- Mung bean flour
 - phenolic acids composition 899
- Mung bean sprouts
 - carbohydrates, effect of blanching 908
 - processing 908
 - storage 908
- Mushroom
 - canned, nisin as additive 849
- Mustard
 - phenolic acids composition 917
- Mustard flour, defatted, phenolic acids composition 914
- Mutagenicity
 - benzo(a)pyrene 841
 - 3-methylcholanthrene 841
 - N-methyl-N-nitro-nitrosoguanidine 841
- Mutton
 - microbial quality 1051
 - tenderization, effect of electrical stimulation 1049
- 1-naphthyl-N-methyl carbamate see carbaryl
- National Research and Development Council and Technology development 821
- Navy bean, phenolic acids composition 899
- Nisin, regulation in India 849
- Nutrition
 - education 1139
 - research 1139
 - training 1139
- Nuts, phenolic acids, determination, GLC-MS 926

Oat

- protein 877
- Offal, bovine, tallow extraction 1047
- Oilseeds, flour, defatted, phenolic acids composition 914
- Okra, pesticide residue determination, colorimetry 944
- Onion
 - S-alk(en)yl-L-cysteine sulfoxide, determination, GC-MS 933
 - antifungal activity 932
 - composition 954
- Open top sanitary cans See cans
- Orange juice, limonin solubility 1093
- Orange oil
 - antifungal activity 965
 - carotenoid content 967
- Orange squash
 - sorbic acid stability 1094
- Organic acids
 - citric acid, strawberry, composition 957
 - L-malic acid, strawberry, composition 957
- Oryzaephilus surinamensis*
 - effect of water 1127
- Osmosis, fruit dehydration 955
- Ovalbumin, tryptic hydrolysis 1068
- Ovalbumin glucose, immunological studies 1067
- Oyster, microbial evaluation 1084
- Packaging
 - effect on beef patties 1032
 - Indian sweet, 'Sohan papri' 989
 - lamb lions 1052
 - pork, effect on microbial growth 1055
 - pork, effect on rancidity 1055
- Packaging, aseptic
 - fruit juices 1098
 - safety 833
 - sterilization of product 833
- Paddy
 - stored, moisture content 865
- Palm oil, solubility 1117
- Papaya waste (for) biogas 974
- Pastilles 985-6
- Patent system, American 822
- Peas
 - dietary fiber determination, HPLC 1132
 - hypocholesterolemic effect 900
 - mineral composition, determination, AAS 943
 - protein, pattern, electrophoretic 901
 - protein, properties 902

- Peach
 composition 954
 mineral composition, *effect of*
 processing 823
- Peanut See groundnut
- Pear
 composition 954
 dehydration 955
- Pear juice concentrate browning
 inhibition (by) cysteine 1095
- Pearl millet
 chapati, *effect of*
 emulsifier 872
 soyflour 872
 phytic acid composition 879
 vitamin B composition 879
- Pearlspot
 stored
 quality 1076
 shelflife 1076
- Pecan
 physical properties 931
 shelling 931
 variety evaluation 931
- Pectin
 antimutagenic activity 841
- Pennisetum americanum* See pearl millet
- Persea americana* See avocado
- Peroxidases, cauliflower 951
- Pesticide residues
 bendiocarb, maize, determination, GC 886
 maize, determination, GC 886
 vegetables, determination, colorimetry 944
- Phaseolus aureus* See green gram
- Phaseolus mungo* See black gram
- Phaseolus radiata* See mung bean
- Phaseolus vulgaris* See haricot bean
- Phenolic acids
 legumes, composition 899
 mustard, composition 917
 nuts, determination, GLC-MS 926
 oilseed flours, defatted, composition 914
 rapeseed flour, composition 917
 sorghum 888
 sorghum, separation, HPLC 888
- Phenolic residues, honey, determination 977
- Phosphate
 effect on lead toxicity 1146
 pork patties, *effect on*
 fat composition 1057
 flavour 1057
 texture 1057
- Phospholipid
 cod storage 1075
 soyabean oil, determination 1118
- Phosphorus, food, composition, *effect of*
 processing 823
- Phytic acid
 pearl millet, composition 879
 rapeseed protein, removal 916
- Pies, microbiological quality 990
- Pigeon pea
 mineral composition 898
 phenolic acids composition 899
- Pineapple
 aroma components 959
 flavour 959
 volatile constituents 960
- Pine nut
 phenolic acids, determination, GLC-MS 926
- Plant (for) pest control 1128
- Polyphenol, sorghum malting 892
- Polysaccharides, inhibitory effects 976
- Polyuronide methoxyl determination 840
- Pork
 convective heat processing, nutrient retention 1054
 infrared processing, nutrient retention 1054
 microbial growth, *effect of* packaging 1055
 quality *effect of* dantrolene sodium 1056
 rancidity, *effect of* packaging 1055
 Trichinae spiralis infection *effect of* microwave cooking 1053
- Prok patties
 fat composition, *effect of* phosphate 1057
 fat composition, *effect of* sodium chloride 1057
 flavour 1057
 effect of sodium chloride/phosphate 1057
 texture *effect of* sodium chloride/phosphate 1057
- Potassium, food, composition, *effect of*
 processing 823
- Potassium sorbate, bologna, microbial growth control 1048
- Potato
 canning (using) OTS cans 832
 composition, determination 948
 mineral composition, determination 949
 fried, mineral composition 823

- Potato (contd.)
 heat processed, nutrient composition 829
 preservation by sodium bisulphite 939
- Potato chips
 cottonseed oil fried, 1-decyne formation 1116
 lipid oxidation 940
- Poultry farms, production factors 1061
- Praline (from)
 candied orange peel 968
 grapefruit peel 968
- Prawn, export 1079
- Preservatives
 nisin (in) processed foods 849
 sodium benzoate, determination, titrimetry 850
 sodium propionate, determination, titrimetry 850
 sodium alicylate, determination, titrimetry 850
- Processing
 convective heating, food, nutrient loss 829
 infrared, food, nutrient loss 829
- Proso millet
 chapati, effect of emulsifiers 872
 soyflour 872
- Prosopis juliflora* See mesquite bean
- Protease (from) *Pseudomonas marinoglutinosa* 1072
- Protein
 alkali treatment (using) cysteine 1015
 beef muscle, emulsifying capacity 1033
 digestion, enzymatic 1138
 fanugreek 1122
 hydrolysis 1137
 maize endosperm 880
 sorghum 894
- Prunus amygdalus* See almond
- Pseudomonas fluorescens*,
 lipase 845, 846
 triacylglycerol acylhydrolase 845
- Pseudomonas marinoglutinosa*
 protease, effect of mackerel protein 1072
- Psophocarpus tetragonolobus*
 See winged bean
- Pumpkin, composition 954
- Quinoa starch 878
- Rabbit meat, tenderness effect of proteinase 1060
- Radiation
 cottonseed gossypol removal 915
 fruit
 disinfestation 956
 quality 956
- Radioimmunoassay
 zearalenol 1144
 zearalenone 1144
- Radish, mineral composition, determination, AAS 943
- Rapeseed flour
 defatted, phenolic acids composition 914
 phenolic acids composition 917
- Rapeseed protein, phytic acid removal 916
- Red common bean see haricot bean
- Red gram see pigeon pea
- Red pepper, fermented, storage stability 945
- Rhizopus*
 lime oil antifungal activity 965
 orange oil antifungal activity 965
- Rice
 Aspergillus, toxin production, effect of temperature 1022
 microbial toxin production 1150
 stickiness, determination, Instron tester 866-7
- Ryegrass composition 954
- Saccharomyces bayanus* see yeast
- Saccharomyces cerevisiae* see yeast
- Safflower seed flour, defatted, phenolic acids composition 914
- Salicylic acid, grape, determination, spectrofluorometry 963
- Salmonella*
 lamb meat 1050
 shellfish 1077
- Salt, savoury flavour 1029
- Sausage
 acceptance sampling 1027
- Sulphur dioxide composition 1027
- Savoury flavour 1029
- Scallop, stored, spoilage 1083
- Seafoods, urea determination, enzymatic method 1070
- Seasoning 1029

- Sensory judgement and food colour 1124
- Sepia aculeata* See cuttlefish
- Sepia pharaonis* See cuttlefish
- Sepioteuthis lessomiana* See squid
- Sesame seed flour, defatted, phenolic acids composition 914
- Sheep meat tenderization, effect of electrical stimulation 1049
- Shellfish
 - microbiological evaluation 1077
 - sodium, determination 1071
- Shrimp
 - ammonia determination, enzymatic method 1070
 - chlorine incorporation 1080
 - stored, indole formation 1081
 - urea determination, enzymatic method 1070
 - sitosterol, oxidation product 1114
- Skim milk powder, flavouring 1005
- Skim milk protein 901
- Snack food, effect of cheese 1025
- Snacking behaviours determination 1125
- Sodium
 - food 1130
 - effect of processing 823
 - pork quality 1056
- Sodium bisulphite, potato preservation 939
- Sodium chloride
 - pork patties, effect on fat composition 1057
 - flavour 1057
 - texture 1057
- Sodium nitrite, bologna, microbial growth control 1048
- Soft drink
 - industry 1087
 - microbial spoilage 1085
 - milk fortification 1086
- Sohan papri* See Indian Sweet
- Solar energy(for) rural areas 836
- Sorbic acid, orange squash stability 1094
- Sorbitol, strawberry composition 957
- Sorghum
 - amylase 893
 - biochemical characteristics 889
 - bird resistance 889
 - chapati
 - effect of emulsifiers 872
 - effect of soy flour 872
 - Sorghum (contd.)
 - cooking quality 891
 - effect of γ -irradiation 890
 - malting
 - polyphenol changes 892
 - effect of tannin 892
 - Nigerian, effect of γ -irradiation 890
 - phenolic acids 888
 - fungus resistance 888
 - protein 894
 - tannin 887
 - tortilla 891
 - Sorghum acaudatum* See sorghum
 - Sorghum bicolor* See sorghum
 - Sorghum guineense* See sorghum
 - Soups canned, nisin as additive 849
 - Soyabean
 - composition 918, 949
 - determination 948, 949
 - flavour 918
 - microbial toxin production 1150
 - mineral composition 949
 - Soyabean oil
 - degummed, phospholipid, determination 1118
 - degumming 1118
 - flavour
 - effect of citric acid 1115
 - effect of iron 1115
 - Soy flour
 - effect on chapati 872
 - defatted, phenolic acids composition 914
 - Soy protein
 - acylated, properties 923
 - hydrolysis, membrane reactor 922
 - properties 919
 - effect of phosphorylation 923
 - rheology 920
 - structure 921
 - Spectroscopy, low-temperature luminescence spectroscopy 842
 - Spices, flavour properties 1029
 - Spray drier, exergy balance 835
 - Staphylococcus aureus*,
 - lamb meat 1050
 - microstructure 1152
 - Starch
 - barley 896
 - maize 881
 - Starch (based) food, heat exchanger 825
 - Steak
 - heat processed, nutrient composition 829
 - Steer's muscle characteristics 1037
 - Sterilization and heat treatment

Storage

- effect of beef patties 1032
- cod, phospholipid 1075
- dogfish quality 1074
- grapefruit, temperature 966
- grape juice
 - acidity 1091
 - colour stability 1091
 - pH 1091
- Indian sweet Sohan papri 989
- mullet
 - quality 1076
 - shelflife 1076
- paddy moisture content 865
- pearl spot
 - quality 1076
 - shelflife 1076
- tilapia
 - quality 1076
 - shelflife 1076
- tomato 952
- wheat *Cryptolestes ferrugineus*
 - growth, malathion degradation 876
- Strawberry composition 957
- Strawberry-flavoured drink
 - colour 958
 - sweetness 958
- Sucrose-ester emulsifier See emulsifiers
- Sugar, strawberry, composition 957
- Sulphathiazole residue, honey, determination, LC 978
- Sulphur dioxide
 - effect of grape desiccation 964
 - effect of grape spoilage 964
- Sunflower protein products
 - nutritive value 925
 - preparation 925
 - properties 925
- Sunflower seed, processing effects 925
- Sweet corn composition 948, 949
- Sweeteners
 - sodium cyclamate determination, titrimetry 850
 - sodium saccharin determination, titrimetry 850
- Sweet dough, fructose corn syrup use 991
- Sweet potato composition 954
- Sweets, 'Sohan papri'
 - packaging 989
 - storage 989
- Tallow extraction, bovine 1047
- Tannin
 - sorghum 887
 - effect of sorghum malting 892
- Tea cream, nitrogenous constituents 1103
- Technology Transfer and National Research and Development Council 821
- Tenderization, mutton, effect of electrical stimulation 1049
- Tetrodotoxin, determination, isotachophoresis 1148
- Texture, Mozzarella cheese 1023
- Thawing, electroconductive, frozen food 824
- Theobromine, cocoa, determination, HPLC 1100
- Thermal properties, beef 1035
- Thiamin See Vitamin B
- Thiobarbituric acid test, chicken fat, malonaldehyde 1062
- Tilapia
 - stored
 - quality 1076
 - shelflife 1076
- Tilapia mossambica See tilapia
- Tomato
 - composition 943, 954
 - fermented, storage stability 945
 - mineral composition, determination, AAS 943
 - storage 952
- Tomato paste canning (using) OTS cans 832
- Tomato paste plant, energy consumption 935
- Tomato products, canned, nisin as additive 849
- Tortilla (from)
 - maize 891
 - sorghum 891
- Torula See yeast
- Toxicity testing, cell culture method 1147
- Triacylglycerol acylhydrolase, *Pseudomonas fluorescens* 845
- Trichinae spiralis* infection
 - effect of cooking 1153
 - pork, microwave cooking 1053
- Trigonella foenum-graecum* See fenugreek
- Trypsin, Kintoki bean, heat inactivation 906
- Tuna
 - composition effect of canning in oil/water 823
 - processing 823
- Turkey
 - convective heat processing, nutrient retention 1054
 - infrared processing, nutrient retention 1054

- Turkey (contd.)
 microwave cooking, energy consumption 1066
 processing, energy consumption 1066
- Urea, seafoods, determination, enzymatic method 1070
- Vacuum packaging, lamb meat 1052
- Vegetables
 composition 954
 determination 948, 949
 fermented, storage stability 945
 flavour 1029
 pesticide residue determination, colorimetry 944
- Vegetable oil, pyrolysis 1119
- Vegetable protein, flavouring property 1029
- Vibrio cholerae* oyster, isolation 1084
- Vicia faba* See broad bean
- Video image analysis, meat 1030
- Vitamin
 canned and pouched cherries 909
 green bean 909
 food, determination 1136
- Vitamin B, pearl millet, composition 879
- Vomitoxin residues, cereals 863
- Walnut, phenolic acids, determination, GLC-MS 926
- Water activity measurement, food 838
- Watercress, aroma volatile components, determination, GC 950
- Wheat
 composition 948, 949
 gliadin 871
 milling 870, 869
 mineral composition 949
 effect of processing 823
 protein properties 873
 stored
 Cryptolestes ferrugineus growth, malathion degradation 876
- Whey, drying, exergy balance 835
- Whey powder
 composition 1021
 flavouring 1005
- Wine
 amine determination, chromatography 1106
 fermentation
 effect of pH 1109
 effect of sulphur dioxide 1109
- Wine (contd.)
 phenol 1108
 quality, effect of grape vine irrigation 1107
 unit for disgorging bottle 1110
- Winged bean, chymotrypsin inhibitor 913
- Xylose-arginine-Maillard reaction product, antioxidant activity 837
- Yeast
 effect on aflatoxin mutagenicity 1156
 (as) flavouring 1029
 growth
 effect of ethanol 1105
 effect of glucose 1105
 instant
 glutathione 847
 hydration 847
 manufacture 847
 packaging 847
- Versinia enterococcolitica*
 lamb meat 1050
- Yoghurt
 antitumor activity 1020
 flavouring 1005
 stored, sugar composition 1019
- Zearalenone, radioimmunoassay 1144
- Zearalenone reductase
 species differences 1145
- Zearalenol, radioimmunoassay 1144

I N D E X

- Acetaldehyde
 - yoghurt, flavour 1198
 - wine, flavour 1198
- Acrylonitrile, food, determination, GLC 1194
- Adaptation to underfeeding 1434
- Additives
 - anticaking agents 1207
 - flow conditioners 1207
 - survey 1204
- African catfish See *Clarias lazera*
- Agaricus bisporus* See mushroom
- Akara See cowpea product
- Alcohol detection 1197
- Almond
 - dietary fibre composition 1254
- Amaranthus hybridus*,
 - composition 1269
 - nutritive value 1269
- Amino acid, mutagenic activity 1183
- α -Amylase binding of calcium 1211
- Annatto extract 1209
- Anola
 - composition 1305
- Anola preserve, quality 1305
- Anthocyanin, grape 1287
- Antibiotics, milk, determination, AOAC *Bacillus stearothermophilus* disc assay 1332
- Anticaking agents 1207
- Antimicrobials, savoury foods 1327
- Antioxidants
 - butylated hydroxy anisole 1205
 - butylated hydroxy toluene 1205
 - propyl gallate 1205
 - tertiary butyl hydroquinone 1205
- Apple
 - acceptability
 - effect of atmosphere 1299
 - effect of temperature 1299
 - aroma concentrate, sensory property 1301
 - aroma constituents, determination, GC 1301
 - calcium composition 1297
 - 'Golden Delicious', storage
 - effect of calcium 1298
 - effect of calcium chloride 1298
 - effect of carbondioxide 1298
 - plasmalemma ATPase 1300
 - stored, acceptability 1299
- Apple juice
 - aroma
 - effect of storage 1395, 1396
 - effect of storage temperature 1396
 - composition 1394
 - rheology 1397
 - volatile constituents 1396
- Apple juice concentrate, fermented 1393
- Apple slice, apple cultivar evaluation 1302
- Apricot, nutrient composition 1295
- Arachis hypogaea* See groundnut
- Aroma
 - apple 1301
 - strawberry 1283
- Aseptic packaging See packaging, aseptic
- Asparagus, peroxidases 1267
- Aspartame See sweetener
- Bacillus*, bakery products, isolation 1314
- Bacillus cereus*
 - cheddar cheese contamination 1331
 - ice cream contamination 1331
 - milk contamination 1331
 - pasteurized milk contamination 1331
 - yoghurt contamination 1331
- Bacillus stearothermophilus* disc assay, milk, antibiotics determination 1332
- Bacon
 - Clostridium botulinum* toxin formation
 - effect of ethyl fumarate 1358
 - effect of methyl fumarate 1358
 - N-nitrosothiazolidine formation 1357
- Bakery products, quality tests 1315
- Baking, potato, effect on minerals 1261
- Banana, dried, hygroscopic behaviour 1290-91
- Banana slice, dehydration by osmosis 1290
- Barley
 - stored
 - mycotoxin 1236
 - odour 1236
- Beef
 - diamine and microbial numbers 1354
 - frozen ground, microbial quality 1353
 - Heifer's, delayed bleeding, effect on sensory property 1351
 - microbial numbers and diamine 1354
 - muscle, calcium metabolism 1352
 - protein degradation
 - effect of pH. 1350
 - effect of temperature 1350

- Beef (contd.)
 - steer's delayed bleeding
 - effect on sensory property 1351
- Beer
 - cans 1412
 - flavour 1413
 - packaging 1411
 - preparation 1411
 - hop oil utilisation 1414
- Beetroot
 - blanching 1259
 - peeling 1259
- Benthosema pterotum* See lantern fish
- Bergmot aroma 1292
- Bergmot oil 1292
- Beverages
 - sweeteners composition 1210
- Bibliography, vegetable products
 - microscopy 1258
- Bioavailability, trace elements 1211
- Biological materials, nitrogen determination 1190
- Biscuit, packaging 1178
- Black gram wadian See savoury food
- Blue whiting
 - emulsifying capacity
 - effect of frozen storage 1346
 - effect of thawing 1346
 - protein solubility
 - effect of frozen storage 1346
 - effect of thawing 1346
- Boar meat, Swedish, acceptance 1360
- Bolti fish fillet
 - microbial quality
 - effect of chlorotetracycline 1377
 - effect of sodium chloride 1377
- Brassica napus* See rapeseed
- Bread
 - iron enriched
 - effect of copper 1316
 - effect of protein 1316
 - physical property
 - effect of field pea flour 1317
 - effect of soy flour 1317
 - polysaccharide composition 1213
 - selenium bioavailability 1433
 - sensory property
 - effect of field pea flour 1317
 - effect of soy flour 1317
 - sunflower protein property 1253
 - wheat based, quality test 1315
- Bream
 - frozen storage 1376
 - stored, sensory property 1376
- Breweries, centrifuge application 1410
- Broiler
 - breast meat, nutrient composition 1363
 - nutrient composition 1364
- Buffalo gourd
 - starch
 - gelatization 1278
 - properties 1279
 - rheology 1278-9
- Buns, microbial evaluation 1314
- Butter, sodium determination, AAS 1339
- Buttermilk, aflatoxin M₁ 1338
- Butylated hydroxy anisole 1205
- Butylated hydroxy toluene 1205
- Cabbage, metal contamination 1271
- Cadmium
 - extraction, hot plate method 1183
 - food, contamination 1440
 - frozen cod, determination 1375
- Cake
 - batter
 - foam drainage 1320
 - stability 1319
 - microbial evaluation 1314
 - sweetening using aspartame 1318
- Calcium, apple 1297
- Cans, beer 1412
- Capelin
 - storage
 - effect on chemical property 1378
 - effect on sensory property 1378
- Caramel 1209
- Carbohydrates
 - grape 1287
 - legumes 1238-9
- Carrot, dietary fibre composition 1260
- Cassava starch, single-cell protein production 1268
- Castor seed oil, fatty acid composition 1419
- Celery
 - blanching 1259
 - peeling 1259
- Cereal products
 - phytate determination 1212
 - polysaccharide composition 1213
- Cereals
 - phytate determination 1212
 - processing, filth reduction 1219
 - proteins 1214, 1222
- Cheese
 - 'brick', manufacture from UF milk 1340
 - cheddar, microbial contamination 1331
 - 'Colby', manufacture from UF milk 1340

- Cheese (contd.)
 - Cuban
 - nitrate composition 1342
 - nitrite composition 1342
 - manufacture from recombined milk 1341
- Cherry, nutrient composition 1295
- Chicken
 - emulsifying capacity
 - effect of frozen storage 1346
 - effect of thawing 1346
 - protein solubility
 - effect of frozen storage 1346
 - effect of thawing 1346
- Chick pea
 - carbohydrates 1238-39
 - flatulence effect 1239
- Child nutrition 1439
- Chlorotetracycline, effect on Bolti fish, microbial quality 1377
- Chocolate
 - moulding 1312
 - effect of potassium carbonate 1313
- Cicer arietinum* See chick pea
- Citrus aroma 1292
- Citrus oil 1292
- Citrus paradisi* See grapefruit
- Clam
 - yeast isolation, effect of storage 1387
- Clarias lazera*
 - nutritive quality 1379
- Clarification, fruit juices by ultrafiltration 1390
- Clostridium botulinum* toxin, ground pork, inhibition 1357
- Clostridium sporogenes* spores
 - determination 1443
 - enumeration 1443
- Coagulation process
 - egg albumen 1191
 - milk 1191
- Cocoa bean fermentation
 - chemistry 1398
 - microbiology 1398
- Cocoa butter
 - alkyloxazole property 1400
 - alkylthiazole property 1400
 - crystallization test 1399
- Cod
 - frozen, cadmium determination 1375
- Colourant
 - annatto extract 1209
 - caramel extract 1209
- Colourant (contd.)
 - food processing 1209
 - paprika 1209
- Condiments
 - sweeteners composition 1210
- Copper
 - intake 1432
 - milk, determination, spectrophotometry 1325
- Cow pea
 - carbohydrates 1238-9
 - flatulence effect 1239
 - hemagglutinin 1241
 - phytic acid 1241
 - tannic acid 1241
 - trypsin inhibitor 1241
- Cow pea product
 - 'Akara'
 - composition 1240
 - properties 1240
- Cranberry
 - anthocyanin recovery 1392
 - juice recovery 1392
- Crassostrea virginica* See oyster
- Creatine, mutagenic activity 1183
- Cucurbita foetidissima* See buffalo gourd
- Cyclodextrin 1311
- Cynoglossus bilineatus* See flat fish
- Cynoglossus lida* See flat fish
- Cynoglossus macrolepidotus* See flat fish
- Cynoglossus semifaciatus* See flat fish
- Dairy, waste water treatment 1323
- Date bars, soy protein isolate and dry skim milk fortified 1281
- Dehydrated food, thermodynamic property 1161
- Dehydration by osmosis, banana slice 1290
- Dietary fibre, carrot 1260
- Dolichos biflorus* See horse gram
- Dry bean, protein digestibility 1242
- Egg
 - preservation, energy consumption 1367
- Egg albumen
 - coagulation 1365
 - rheology 1366
 - water retention property 1368
- Emblica officinalis* See anola
- Endo-polygalacturonase See enzymes
- Energy, development 1182
- Enterobacter, bakery products, prevalence 1314

Enzymes

- endopolygalacturonase, tomato processing 1270
- lipxygenase activity, grape 1286
- pectin methyl esterase, tomato juice, thermal resistance 1276
- peroxidase, grape
 - properties 1289
 - purification 1289
- polyphenol oxidase, grape 1288
- starch industry 1309

Escherichia

- bakery products, isolation 1314

Ethanol

- wine, determination, GC 1403

Ethephon application

- effect on grape
 - composition 1284
 - yield 1284

Ethoxyquin, milk, determination, HPLC and fluorescence 1326

Ethyl fumarate, bacon, antibotulinal activity 1358

Fat

- degradation during frying 1421
- solid composition, determination, NMR and DSC 1420
- technology 1418

Fermentation, cocoa bean 1398

Fermented food, acetaldehyde determination, HPLC 1198

Field pea flour, effect on bread properties 1317

Fin fish, classification, sensory methodology 1369

Fish

- amine determination, GC 1368
- canned
 - chemical property 1372
 - physical property 1372
 - sensory property 1372
- classification, sensory methodology 1369
- emulsifying capacity
 - effect of frozen storage 1346
 - effect of thawing 1346
- frozen, microbial quality 1371
- iced, microbial quality 1371
- methyl mercury determination, GLC 1370
- packaged
 - chemical property 1372
 - physical property 1372
 - sensory property 1372

Fish (contd.)

- protein solubility
 - effect of frozen storage 1346
 - effect of thawing 1346
- raw, microbial quality 1371
- retort pouched
 - chemical property 1372
 - physical property 1372
 - sensory property 1372
- Fish powder, protein quality 1435
- Flat fish composition 1380
- Flatulence effect of legumes 1239
- Flavour
 - artificial, drying 1208
 - beer 1413
 - spray drying 1208
- Flow conditioner 1207
- Foam breaker, disk diameter 1180
- Food
 - acrylonitrile determination, GLC 1194
 - classification 1436
 - contamination 1440
 - dehydrated, thermodynamic property 1161
 - irradiated, consumer acceptance 1168
 - irradiation 1163
 - regulation 1167
 - toxicity 1167
 - mechanical property 1162
 - microbial estimation 1196
 - nutritive value 1436
 - peptide determination, HPLC 1192
 - preservation by irradiation 1164, 1166-7
 - protein quality evaluation 1435
 - quality control and microbial estimation 1196
 - rheology 1429
 - selenium determination, AAS 1193
 - styrene migration 1179
 - sweeteners composition 1210
 - vitamin B₆ 1437
- Food borne bacteria, water activity influence 1442
- Fowl meat, frozen, ground, microbial quality 1353
- Fruit juices
 - aseptic packaging 1391
 - clarification by ultrafiltration 1390
- Frying, effect on potato minerals 1261
- Fungus
 - enumeration 1200
 - growth effect of water activity 1200
- Gelatinization
 - buffalo gourd starch 1278

Glucose mutagenic activity 1183
Goat, criollo, of Mexico, carcass
characteristics 1355

Grape

anthocyanin 1287
carbohydrates 1287
ethephon application
 effect on yield 1284
 effect on composition 1284
lipoxygenase activity 1286
peroxidase
 property 1289
 purification 1289
phenolics 1287
polyphenol oxidase, properties
 1288
quality 1285
weight 1285

Grapefruit

aroma 1292
decaying fruit contaminant 1293
polyethylene film packaged, de-
caying fruit contaminant 1293

Grapefruit oil 1292

Grape juice 1397

Green bean

colour, *effect of storage* 1244
quality, *effect of transport* 1243
vitamin A 1243
vitamin C 1243

Green gram wadian See savoury foods

Groundnut

aflatoxin 1257
 determination 1256
cotyledon structure 1255

Groundnut oil, fatty acid compo-
sition 1419

Guava cheese

nutritive value 1304
shelflife 1304

Ham

quality
 effect of processing 1359
 effect of tenderization 1359
 effect of tumbling 1359
yield
 effect of processing 1359
 effect of tenderization 1359
 effect of tumbling 1359

Hemagglutinin, cow pea 1241

Hempseed oil, fatty acid composition
1419

Horse gram

carbohydrates 1238-9

Horse gram (contd.)

flatulence effect 1239
protein quality 1435

Horse mackerel See mackerel

Ice cream, microbial contamination 1331

Infant food, vitamin K₁ determination,
HPLC 1438

Insect fragments, plant products 1430

Irradiated food, consumer acceptance
1168

Irradiation

food 1163-5
effect on lentil 1245

Kefir, aflatoxin M₁ 1338

Klebsiella, bakery products, isolation
1314

Labeo rohita, actomyosin denaturation 1381

Lactose

milk, *effect on rat growth* 1329
yoghurt, *effect on rat growth* 1329

Lamb meat

diamine 1354
microbial evaluation 1354

Lantern fish

biochemical characteristics 1382
microbial quality 1382
nutritive value 1382

Lead

extraction, hot plate method 1183
food contamination 1440

Lemon, aroma 1292

Lemon oil 1292

Lens culnaris See lentil

Lentil

nutritive value *effect of irradiation*
1245
protein solubility, *effect of irradiation*
1245

Limette aroma 1292

Limette oil 1292

Linseed oil, fatty acid composition 1419

Lipid

prawn 1388
shrimp 1388

Lipoxygenase activity, grape 1286

Lizard fish

packaging 1384
storage 1384

Mackerel

emulsifying capacity
effect of frozen storage 1346
effect of thawing 1346

- Mackerel (contd.)
 - microbial quality 1373
- *Macrobrachium rosenbergii* See prawn
- Maillard reaction product 1184
- Maize
 - aflatoxin 1235
 - composition, effect of ozone 1234
 - milling, reverse osmosis application 1230
 - protein 1233
 - starch 1231
 - phosphorus determination 1232
- Mallotus villosus* See capelin
- Malt
 - fermentability 1409
 - phenol determination, colorimetry 1408
- Mandarin aroma 1292
- Mandarin oil 1292
- Manganese
 - intake 1432
- Margarine
 - shelflife 1422
- Meat
 - canned
 - exporters 1345
 - importers 1345
 - emulsifying capacity
 - effect of frozen storage 1346
 - effect of thawing 1346
 - flavour
 - effect of collagen 1348
 - effect of myofibrillar protein 1348
 - handling 1344
 - muscle protein
 - effect of pH 1347
 - effect of temperature 1347
 - packaging, flexible 1344
 - processed 1344
 - protein solubility
 - effect of frozen storage 1346
 - effect of thawing 1346
 - tenderness
 - effect of collagen 1348
 - effect of myofibrillar protein 1348
 - effect of pH 1347
 - effect of temperature 1347
- Meat pie
 - production 1349
 - quality 1349
- Mercenaria campechiensis* See clam
- Methyl fumarate, bacon, antibotulinal activity 1358
- Methyl mercury
 - fish, determination, GLC 1370
 - shellfish, determination, GLC 1370
- Microbiological evaluation, food 1196, 1199
- Micrococcus*
 - bakery products, isolation 1314
- Milk
 - antibiotics determination, AOAC *Bacillus stearothermophilus* disc assay 1332
 - coagulation 1191
 - copper determination, spectrophotometry 1332
 - cow's, copper determination, spectrophotometry 1325
 - ethoxyquin determination, HPLC and fluorescence 1326
 - lactose and growth of rats 1329
 - microbial contamination 1331
 - protein hydrolysis, determination 1328
 - reconstituted
 - acceptability 1333
 - sensory property 1333
 - UHT processing 1324
- Milk products
 - microbial contamination 1331
- Milk protein stabilizer, effect on yoghurt 1337
- Mould growth effect of water activity 1200
- Muffins based on sunflower seed hull flour, sensory property 1251
- Mushroom
 - browning control, enzymatic method 1202
 - polyphenol oxidase activity, browning control 1202
 - sodium composition 1203
- Muskmelon, metal contamination 1271
- Nectarine, nutrient composition 1295
- Nemipterus japonicus* See bream
- Nitrosocompound, mutagenicity 1441
- Nutrient intake 1432
- Oil
 - volatile constituents, oxidation during storage 1417
- Oilseeds, oil expression 1416
- Okra
 - canned
 - quality 1277
 - sensory property 1277
- Orange
 - acceptability
 - effect of atmosphere 1299
 - effect of temperature 1299
 - aroma 1292

- Orange (contd.)
 - decay control by azomethine 1294
 - Penicillium* decay control by azomethine 1294
 - stored, acceptability 1299
- Orange juice
 - rheology 1397
- Orange oil 1292
- Orangochlorine residue analysis, GC 1431
- Organonitrogen residue analysis, GC 1431
- Organophosphorus residue analysis, GC 1431
- Oyster
 - methyl mercury determination, GLC 1370
 - yeast isolation, effect of storage 1387
- Packages
 - polymeric, air content 1177
- Packaging
 - food, Japan 1170
 - Japanese 1169
 - label cups 1172
 - savoury food 1237
 - sealing 1172
 - snackfood 1178
 - thermoforms 1172
- Packaging, aseptic, fruit juices 1391
- Packaging material
 - additive migration into food 1204
 - Japanese 1171
 - plastic 1172
 - PVC blown films 1174
 - sterilization 1173
- Papaya
 - drying 1303
 - intermediate moistured 1303
- Paprika 1209
- Peach
 - high vacuum flame sterilized, storage 1296
 - nutrient composition 1295
- Pear, high vacuum flame sterilized, storage 1296
- Pectin
 - tomato products, interaction with protein 1274
 - wetting by ethanol 1306
- Pectin methyl esterase See enzymes
- Pepper
 - black
 - papaya seed adulteration 1425
 - starch properties 1424
- Peptide, food, determination, HPLC 1192
- Peroxidase, *Asparagus* 1267
- Pesticide residue
 - analysis, GC 1431
- Phaseolus vulgaris* See dry bean
- Phenolics
 - grape 1287
- Phytate, cereals and cereal products 1212
- Phytic acid
 - binding of trace elements 1211
 - cow pea 1241
- Pickle
 - 'Gundruk', flavour 1426
- Piper nigrum* See pepper
- Plantain, protein quality 1435
- Plum, nutrient composition 1295
- Pollock
 - canned
 - chemical property 1372
 - physical property 1372
 - sensory property 1372
 - packaged
 - chemical property 1372
 - physical property 1372
 - sensory property 1372
 - pouched
 - chemical property 1372
 - physical property 1372
 - sensory property 1372
- Polyphenol oxidase See enzymes
- Polysaccharides, cereal products 1213
- Poppy seed oil, fatty acid composition 1419
- Pork
 - diamine 1354
 - emulsifying capacity
 - effect of frozen storage 1346
 - effect of thawing 1346
 - ground; *Clostridium botulinum*, toxin inhibition 1356
 - microbial numbers 1354
 - protein solubility
 - effect of frozen storage 1346
 - effect of thawing 1346
- Port, 5-hydroxymethylfurfural determination, HPLC 1406
- Potato
 - cooked
 - rheology 1265
 - texture 1265

Potato (contd.)

- glycoalkaloid composition
 - effect of location 1264
 - effect of storage time 1264
- lipid determination 1262
- mineral composition, effect of
 - cooking 1261
- rheology of cooked potato starch
 - determination 1262
 - gelatinization 1263
 - effect of heat 1220
 - effect of moisture 1220
 - phosphorus determination 1232
- texture of cooked potato 1265

Poultry

- carcass, *Salmonella*
 - identification 1362
 - isolation 1362
- microbial quality 1361

Prawn

- lipid composition 1388
- shelflife
 - effect of carbon dioxide 1389
 - effect of microorganisms 1389
 - effect of storage temperature 1389

Preservation

- food by irradiation 1164

Prochilodus scrofa

- Brazilian
 - amino acid composition 1385
 - fatty acid composition 1385

Propyl gallate 1205

Protein

- food quality evaluation 1435
- milk hydrolysis determination 1328

Protein concentrate

- dry bean, digestibility 1242

Protein products, salt free 1183

Prunus amygdalus See almond

Prunus armeniaca See apricot

Prunus avium See cherry

Prunus domestica See plum

Psettodes erumei See flat fish

Puffs, microbial quality 1314

Ragi

- protein quality 1435

Rainbow trout

canned

- chemical property 1372
- physical property 1372
- sensory property 1372

Rainbow trout (contd.)

packaged

- chemical property 1372
- physical property 1372
- sensory property 1372

pouched

- chemical property 1372
- physical property 1372
- sensory property 1372
- species identification 1374

Rapeseed, protein, globulin structure 1246

Rapeseed oil, fatty acid composition 1419

Rastrelliger kanagurta See mackerel

Rennet, effect on skim milk thermal conductivity 1334

Research and development management evaluation 1159

Rheology, buffalo gourd starch 1278-9

Rheology models based on water binding 1247

Rhodotorula rubra See yeast

Rice, milling 1215

Rum acidity 1415

Rye, infra-red radiation 1228

Safflower seed oil

- fatty acid composition 1419

Salmon species identification 1374

Salmonella

- frozen ground beef 1353
- frozen ground fowl meat 1353
- poultry carcass 1362

Sardine

- microbial quality 1373

Sardinella longiceps See sardine

Saurida See lizard fish

Savoury foods

- antimicrobial agents 1237
- manufacture 1237
- packaging 1237
- storage 1237

Selenium

- food determination, AAS 1193

Sensory evaluation 1427

- soy flour based product 1248

Sesame oil, fatty acid composition 1419

Shellfish

- methylmercury determination, GLC 1370
- microbial quality
 - effect of storage 1387
 - effect of water 1387

- Sherry
 - maturation chemistry 1402
 - volatile constituents 1402
- Shrimp
 - canned
 - chemical property 1372
 - physical property 1372
 - sensory property 1372
 - lipid composition 1388
 - methyl mercury determination, GLC 1370
 - packaged
 - chemical property 1372
 - physical property 1372
 - sensory property 1372
 - pouched
 - chemical property 1372
 - physical property 1372
 - sensory property 1372
- Single cell protein production *from* cassava starch 1268
- Skim milk
 - date bars fortification 1281
 - thermal conductivity
 - effect of* rennet treatment 1334
 - effect of* water content 1334
- Skim milk curd
 - thermal conductivity
 - effect of* rennet treatment 1334
 - effect of* water content 1334
- Snack food
 - packaging 1178
- Sodium
 - butter determination, AAS 1339
 - mushroom 1203
- Sodium chloride
 - effect on* Bolti fish fillet microbial quality 1377
- Sodium dodecyl sulphate See surfactant
- Sorbic acid
 - dissociation at low water activity 1206
 - wine preservation 1404
- Sorghum
 - cell wall isolation and analysis 1229
 - fluorescence microscopy 1229
 - microspectrofluorimetry 1229
- Soyabean oil, fatty acid composition 1419
- Soy-cheese whey curd
 - production 1343
 - texture 1343
- Soy flour
 - effect on* bread property 1317
- Soy flour products
 - properties 1249
 - sensory property 1248
 - texture 1249
- Soy protein
 - effect of* ascorbic acid 1250
 - effect of* iron 1250
- Soy protein isolate, date bar-fortification 1281
- Spaghetti
 - stickiness 1321
- Staphylococcus aureus*
 - bakery products, isolation 1314
 - frozen ground beef 1353
 - frozen ground fowl meat 1321
 - heat injury, *effect of* water activity 1444
- Starch
 - buffalo gourd 1278-9
 - electrolyte interaction 1308
 - industry
 - enzyme engineering 1309
 - waste water treatment 1310
 - terminology 1307
- Storage
 - green bean *effect on* colour 1244
 - guava cheese
 - effect on* nutritive value 1304
 - effect on* shelflife 1304
 - high vacuum flame sterilized fruits 1296
 - meat and fish
 - effect on* emulsifying capacity 1346
 - effect on* protein solubility 1346
 - effect on* potato glycoalkaloid composition 1264
 - savoury foods 1237
- Strawberry
 - aroma 1283
 - distribution of
 - calcium 1282
 - magnesium 1282
 - potassium 1282
 - minerals, 1282
 - sulphited, minerals 1282
- Streptococcus faecalis*
 - frozen ground beef 1353
 - frozen ground fowl meat 1353
- Sunflower grit protein 1252
- Sunflower protein 1252
 - bread 1257
 - wheat dough 1257
- Sunflower seed hull flour dietary fibre 1251

Surfactant, potato starch gelatinization 1263

Sweeteners

aspartame, cake sweetener 1318
cyclamate 1210
food, composition 1210
saccharin 1210

Sweet potato patties

colour

effect of curing 1266
effect of starch 1266
effect of storage 1266
effect of sucrose 1266

flavour

effect of curing 1266
effect of starch 1266
effect of storage 1266
effect of sucrose 1266

preparation 1266

texture

effect of curing 1266
effect of starch 1266
effect of storage 1266
effect of sucrose 1266

Swordfish, methyl mercury, determination, GLC 1370

Tannic acid, cow pea 1241

Tapioca

protein quality 1435

Tea

manufacture, carotenoid degradation 1401

Tenside identification 1195

Tertiary butyl hydroquinone 1205

Thawing

meat and fish, effect on
emulsifying capacity 1346
protein quality 1346

Tomato

metal contamination 1271
processing using endopolygalacturonase 1270
unscaled injury control 1272

Tomato catsup, rheology 1273

Tomato concentrate, rheology 1273

Tomato juice

pectin interaction with protein 1274
pectin methyl esterase thermal resistance 1276
rheology 1273

Tomato products

pectin interaction with protein 1274
rheology 1273

Trypsin inhibitor, cow pea 1241

Trichosporon See yeast

Tuna

methyl mercury determination, CLC 1370
selenium bioavailability 1433

Vegetable oil

technology 1418
Turkish, fatty acid composition 1419

Vegetable products

microscopy, bibliography 1258

Vigna sinensis See cow pea

Vigna unguiculata See cow pea

Viscometer 1181

Vitamin B₆

food 1437

Vitamin K₁

infant food, determination, HPLC 1438

Waste water treatment

dairy 1323
starch industry 1310

Water activity

measurement 1188
by filament hygrometer 1189

Wheat

filth reduction 1219
kernel hardness
effect of moisture 1216
effect of protein 1216
kernel, rheology 1218
kernel sprouting detection 1217
moisture determination 1221
protein 1222
gliadin 1223-4
quality 1435
sprouting 1225-6
starch
effect of heat-moisture treatment 1220

Wheat bran

polysaccharide composition 1213
selenium bioavailability 1433

Wheat dough

sunflower protein property 1257

Wheat flour

amino acid composition 1226
property 1227
protein 1226
gliadin 1223-4
rheology 1225
selenium bioavailability 1433
sprouting and baking quality 1226
starch 1226
property 1225

Wheat products

selenium bioavailability 1433

Wine

- acetaldehyde determination, HPLC 1198
 - ethanol determination, GC 1403
 - flavour 1198
 - pesticide residues
 - effect of caseinate 1405
 - effect of bentonite 1405
 - effect of charcoal 1405
 - preservation using sorbic acid 1404
 - effect of sorbic acid 1404
- Wort boiler, heat recovery 1407
- enomugil thoburni*, isohalic sorption isotherm application 1386

Yeast, growth, effect of water activity 1200

Yoghurt

- acetaldehyde determination, HPLC 1198
- aflatoxin M₁ 1338
- chemical property, effect of milk protein stabilizer 1337
- flavour 1198
- lactose and growth of rats 1329
- microbial contamination 1331
- microstructure 1336
- physical property, effect of milk protein stabilizer 1337
- sensory property, effect of milk protein stabilizer 1337

Zinc intake 1432

I N D E X

- Adulteration, citrus juice 1696
- Aflatoxin
 - cow pea, determination 1542
 - horse gram, determination 1542
 - production 1773
 - effect on protein nutritive value 1772
- Alcohol
 - aldehyde separation during distillation 1485
 - extraction method
 - rice bran oil refining 1515
- Alkali neutralization, rice bran oil refining 1515
- Aldehyde, alcohol distillation, separation 1485
- Aldicarb residue, coconut 1560
- Amine, solvent extract process 1712
- Amino acid
 - oat 1522
 - potato effect of cooking 1566
 - rye 1522
 - soyabean 1522
 - wheat 1522
 - tomato products effect of heating 1574
- α -amylase, harrirot bean glycoprotein interaction 1547
- Andrographis paniculata* seed oil, composition 1716
- Annona squamosa* See custard apple
- Antimicrobial activity
 - Butylated hydroxyanisole effect on *Staphylococcus aureus* 1499
 - hydroxycinnamic acid 1501
 - nitrite 1495
 - phosphate in food 1496
 - sodium chloride 1495
 - spices 1738
 - spice oil 1738
- Anti-mycotoxigenic activity, caffeiene 1702
- Antioxidant, olive oil stability 1718
- Antioxidative activity
 - spices 1739
- Apple
 - enzymic colour formation 1584
 - phenolic oxidation 1584
 - polyphenol oxidase activity 1584
 - sauce, rheology 1748
- Aroma
 - cooked beef 1650
 - fish, effect of bisulphite 1683
 - maize tortilla 1539
- Arthriniun phaeospermum*
 - sweet potato, isolation 1571
- Ascorbic acid
 - effect on beef iron composition 1649
 - dehydrated green pepper 1744
 - food, determination 1766
- Aseptic packaging See packaging, aseptic
- Aspergillus flavus*
 - aflatoxin production 1774
 - cyclopiazonic acid effect on broiler 1672
- Aspergillus parasiticus* aflatoxin production 1773-4
- Avocado
 - export 1578
 - market conditions in Japan 1578
- Bacon
 - carcass, muscle pH 1660
 - phosphate antimicrobial activity 1496
- Baked goods, phosphate as ingredient 1497
- Bakery products, crumpet storage 1599
- Baking, effect of irradiation of wheat 1521
- Banana
 - ripening, starch-sugar changes 1578
 - starch-sugar changes during ripening 1578
- Barley, protein composition 1541
- Beef
 - aroma 1650
 - carcass evaluation, video image analysis system 1651
 - composition effect of storage 1648
 - cooked, aroma 1650
 - enterotoxin, staphylococcal, determination, immunosorbent assay 1647
 - iron composition
 - effect of ascorbic acid 1649
 - effect of heating 1649
 - Salmonella* isolation 1653
 - staphylococcal enterotoxin determination, immunosorbent-assay 1647
 - Staphylococcus aureus*, isolation 1653
 - steak, aseptically packaged, colour, effect of microorganisms 1652

- Beef (contd.)
 steak, aseptically packaged
 odour effect of microorganisms 1652
 pH, effect of microorganisms 1652
 stored, weight loss 1648
 weight loss, effect of storage 1648
- Beverage
 container 1454
 phosphate as ingredient 1497
- Biodegradation, caffeine 1703
- Bioenergy 1466
 conversion technology 1467
- Biscuit
 composition, determination 1604
 dough composition, determination 1604
 dough fat 1595
- Bisulphite, effect on fish aroma 1683
- Biotechnology 1447
- Bread
 dough fermentation 1600
 fiber-supplemented, physiological effects 1602
 fruit based, moisture content 1601
 inositol phosphate 1523
 phosphate antimicrobial activity 1496
 sodium content 1603
 acceptability 1603
 wheat based, baking quality 1519
 wheat malt utilization 1520
- Bread baking
 wheat, effect on deoxynivalenol 1527
- Breakfast cereal
 iron availability 1508
 effect of breakfast cereal composition 1508
 effect of breakfast cereal processing 1508
- Broiler
 acceptability effect of processing 1671
 effect of cyclopiazonic acid 1672
 processing
 effect on acceptability 1671
 effect on quality 1671
 effect on yield 1671
 quality effect of processing 1671
 yield effect of processing 1671
- Butylated hydroxyanisole
 antimicrobial activity
 effect of casein 1500
 effect of maize oil 1500
- Butylated hydroxyanisole (contd.)
 milk products, determination, GC 1625
 effect on soyabean flavour stability 1713
 effect on *Staphylococcus aureus* 1499
- Butylated hydroxytoluene
 milk products, determination, GC 1625
 effect on soyabean oil flavour stability 1713
- Butyraldehyde, effect on tea flavour 1699
- Cabbage, canning, tin free steel suitability 1450
- Caffeine
 antimycotoxigenic activity 1702
 biodegradation 1703
- Cake baking
 rice flour treatment 1514
- Calliopsis elegans* seed oil composition 1716
- Campylobacter jejuni*, milk, isolation 1632
- Can
 filling 1692
 packaging 1692
 soft drink 1694
 tin free steel can suitability for food products 1450
 tinplate can pitting 1451
- Candida* See yeast
- Candy
 ingredients 1596
 processing 1596
- Canned
 fruit preserves
 iron composition 1576
 tin composition 1576
- Canned food
 heating 1452
 water activity 1477
- Canning
 food products using tin free steel cans 1450
- Canola
 carbohydrate composition 1551
 phenolic composition 1551
- Carbaryl residue, wheat, determination. HPLC 1530
- Carbohydrate
 canola 1551
 fructose separation, chromatography 148
 groundnut 1556
 rapeseed 1551
 soy flour 1556

- Carotene, cow pea, composition 1544
- Casein
- hydrolysate,
 - characterisation 1622-3
 - detection 1622-3
 - purification 1623
 - proteolysis 1612
 - renneted, coagulation 1617
- Cashew apple beverage 1709
- Cassava, nutritive value 1572
- Cereals
- disinfestation
 - by ethylene oxide 1511
 - by hydrocyanic acid 1511
 - by methylbromide 1511
 - by phosphine 1511
 - lipid extract, fatty acids determination, HPLC 1532
 - lysine quality, biological assay 1509
 - phosphate as ingredient 1497
 - protein quality, biological assay 1509
- Cheddar cheese See cheese
- Cheese
- 'cheddar', bitter compounds 1640
 - 'cottage', sodium composition, acceptability 1603
 - Phosphate antimicrobial activity 1496
 - 'San Simon', water activity 1641
 - water activity 1641
- Chelating agent, skim milk coagulation inhibition 1610
- Chemical treatment, cereals, microbial control 1510
- Chilling, pork carcass moisture loss 1656
- Chlomydomyces palmarum*, feronia, disease 1587
- Chlorophyll degradation, heat processed spinach 1565
- Chocolate 1597
- edible fats 1595
 - milk based, thiamin determination, HPLC 1598
- Chymosin
- immobilization 1609
 - milk coagulation 1609
- Chymotrypsin inhibitor, soyabean 1555
- Cinnamon, fungus isolation 1746
- Citrate starch analysis 1594
- Citrinin, effect of caffeine 1702
- Citrus juice adulteration, detection 1606
- Citrus paradisi* See grapefruit
- Cleaners
- high capacity rotary screen grain pre-cleaners 1458
- Cleaning equipment
- cask 1463
 - keg 1463
- Clostridium botulinum*, sausage, isolation 1646
- Clove, antioxidative effect 1739
- Clove oil 1774
- Coagulation, renneted casein 1617
- Coconut, aldicarb residue 1560
- Cod
- deterioration index 1681
 - nitrogen 1681
- Coffee, methylxanthine formation 1703
- Coliform
- detection, rapid impedimetry 1491
 - fermented fish 1685
- Colourant
- Monascus* pigment, water soluble 1504
 - paprika 1741
- Computer application in packaging 1454
- Continuous fluidized bed freezer 1461
- Cooking
- effect on beef iron composition 1649
 - effect on fish fillet 1678
 - microwave
 - effect on ingredients 1448
 - effect on microorganisms 1448
 - effect on potato amino acid 1566
 - effect on potato vitamin C 1568
- Cooking oven, smoke free 1464
- Coomassie Blue G250 test, protein 1475
- Corochorus trilocularis* seed oil
- composition 1716
- Cottonseed, extraction 1711
- Cottonseed flour
- succinylated, protein isolate 1550
- Cow pea
- aflatoxin determination 1542
 - cooked, composition 1544
 - Nigerian, oligosaccharide composition 1543
 - raw, composition 1544
- Crambe as industrial raw material 1549
- Cream fat
- edible 1595
- Crotalaria heyneana* seed oil composition 1716
- Crumpet storage 1599
- Curd
- renneted
 - property 1635
 - structure 1635

- Custard apple
 - chemical composition 1583
 - physico-morphological characteristics 1583
- Cyclopiazonic acid, effect on broiler 1672
- Dairy industry
 - ultrafiltration technique 1462
- Dairy products
 - biotechnology 1447
 - off-flavour 1628
 - phosphate as ingredient 1498
 - quality
 - off-flavour 1628
- DDT residues, milk 1626
- Dehydrated green pepper, ascorbic acid 1744
- Dehydration
 - fermented maize meal
 - effect on physicochemical property 1540
 - effect on protein quality 1540
 - effect on sensory property 1540
- Deoxynivalenol
 - wheat effect of milling 1527
- Dietary fat
 - effect on turkey meat
 - lipolysis 1673
 - oxidation 1673
- Digestion
 - Samai starch 1593
 - Sanwa starch 1593
- Dill oil 1714
- Dispense equipment 1463
- Dolichos biflorus* See horse gram
- Dolichos lab lab* See field bean
- Dough
 - effect of irradiation of wheat 1521
- Dough fermentation
 - bread 1600
- Drying, hot air drying, cereal microbial control 1510
- Edible fat for confectionery production 1595
- Egg
 - flavour 1675
 - weighing 1674
- Egg products
 - mix, frozen 1676
 - sausage sensory property
 - effect of sodium chloride 1677
 - effect of protein 1677
 - effect of whey 1677
- Egg products (contd.)
 - sausage water activity
 - effect of sodium chloride 1677
 - effect of protein 1677
 - effect of whey 1677
- Eleusine coracana* See ragi
- Embllica officinalis* seed oil composition 1716
- Emulsification
 - sausage, soy protein 1645
- Energy
 - bioenergy 1466
 - conversion technology 1467
 - savings 1469
 - solar energy storage 1468
- Enterotoxin
 - Staphylococcus aureus*, whey, production 1642
 - staphylococcal, meat, determination, immunosorbent assay 1647
- Enzymes
 - irradiated potato 1569
- Ephestia cautella*
 - sorghum infested, control by
 - fenitrothion + bioresmethrin 1537
 - primiphos methyl + carbaryl 1537
- Escharichia coli* recovery 1768
- Essential oil 1714
- Ethanol, effect on pectin 1474
- Ethylamine, tea, determination, HPLC 1701
- Ethylene oxide, cereal, disinfestation 1511
- Export, tropical fruits 1578
- Fabricated foods, gelling agent 1747
- Fats
 - edible, Uttar Pradesh 1731
 - emulsion stabilized, flavour evaluation 1736
 - milk 1693
 - yeast
 - composition 1488
 - production 1488
- Fatty acids
 - cereal lipid extract, determination, HPLC 1532
 - fractionation by column distillation 1734
 - industry, American 1733
 - milk determination 1620
 - rice bran oil refining
 - by alcohol extraction 1515
 - by alkali neutralization 1515
 - saturated, separation 1735

Fatty acids (contd.)

- Skim-milk coagulation inhibition 1610
- soyabean oil 1726
- unsaturated, separation 1735

Fermentation

- goat's milk 1627

Fermented

- fish
 - microbiological evaluation 1685-6
 - safety evaluation 1685-6
- maize meal
 - effect of dehydration 1540
 - effect of soy flour 1540

Ferona, disease by *Chlamydomyces palmarum* 1587

Fiber supplemented bread, physiological effects 1602

Field bean, carbohydrate isolation 1545

Filling equipment 1463

Filtration, food industry 1462

Fish

- aroma, effect of bisulphite 1683
- fermented
 - microbiological evaluation 1685
 - safety evaluation 1685
- fillet effect of cooking 1678
- marine
 - deterioration index 1681
 - nitrogen 1681
- microbiological evaluation 1684-5
- muscle, frozen
 - elasticity 1679
 - emulsifying capacity 1679
 - morphology 1679
 - viscosity 1679
- packaged
 - microbiological evaluation 1684
 - sensory evaluation 1684
- phosphate antimicrobial activity 1496
- sensory evaluation 1684

Fish patties

- minced, texture
 - effect of soy flour 1680
 - effect of soy protein concentration 1680
 - effect of sodium alginate 1680

Flavour

- artificial 1503
- egg 1675
- maize tortilla 1539

Flavour (contd.)

- soyabean oil 1727
 - effect of butylated hydroxyanisole 1713
 - effect of butylated hydroxytoluene 1713
 - effect of propyl gallate 1713
 - effect of tertiary butyl hydroxyquinone 1713
- stimuli 1754
- tea, effect of processing 1699

Flounder

- deterioration index 1681
- nitrogen 1681

Folacin See folic acid

Folic acid

- cow pea, composition 1544
- dehydrated green pepper 1744

Food

- ascorbic acid determination 1766
- canned, water activity 1477
- gelling agent 1747
- hedonic quality 1752
- metabolisable energy 1759
- microbial pathogen 1767
- mycotoxin, regulation 1771
- phytic acid determination, HPLC 1479
- preservation by irradiation 1502
- texture 1751
- thermal processing 1449
- virse detection 1770
- vitamin B₆, thermal stability 1764
- water activity 1476
- Yersinia enterocolitica*
 - detection 1494
 - enumeration 1494

Food strategy 1446

Frankfurters

- packaged
 - microbial quality
 - effect of light 1668
 - effect of storage 1668
 - effect of temperature 1668
 - physicochemical property
 - effect of light 1668
 - effect of storage 1668
 - effect of temperature 1668
 - sensory property
 - effect of light 1668
 - effect of storage 1688
 - effect of temperature 1668
 - phosphate antimicrobial activity 1496
 - texture 1670

- Frankfurters (contd.)
 thermal processing *effect on weight* 1667
 weight loss *during thermal processing* 1667
Freezer, continuous fluidized bed freezer 1461
Freezing
 capsule packed freezing
 of cooked rice 1512
 of rice product 1512
Frozen egg mix 1676
Fructose
 carbohydrate separation, chromatography 1480
 strawberry, composition *effect of* thawing 1577
Fruit juices
 export 1695
 phosphate antimicrobial activity 1496
Fruits
 export 1578
 market conditions in Japan 1578
 phosphate *as* ingredient 1498
 preserves, canned, composition 1576
Fumigation, cereals 1511
Fusarium solani, lipase production 1490

Gas measurement *in* food 1465
Gelation, evaporated milk 1611
Gelling agent, fabricated food 1747
Gels
 phosphate *as* ingredient 1498
 rheology 1750
Genetics and phycotechnology 1483
Geraniol, *effect on* tea flavour 1699
Germination
 effect on oat protein 1533
 wheat
 effect on breadbaking 1524
 effect on crumb firmness 1524
 effect on flour 1524
Gibberellic acid
 effect on kinnow fruit storage 1581
 effect on wheat malting 1520
Glucose, strawberry, composition *during* thawing 1577
Gluten, wheat flour 1528
Glutenine, wheat flour, bread baking quality 1525

Glycerol analysis, gas chromatography 1481
Glycoprotein, haricot bean, interaction with insect amylase 1547
Grape, yeast isolation 1487
Grapefruit, terpenoid biosynthesis 1579
Groundnut 1563
 bibliography 1561
 varieties, characteristics 1562
Groundnut flour, carbohydrate composition 1556
Guava
 Guignardia fruit rot 1586
 shelflife 1585
Gum, phosphate *as* ingredients 1498

Ham
 colour *during* maturation 1664
 Lactobacillus viridescens heat resistance 1662
 protein modification *during* maturation 1663
 yield, *effect of* curing brine 1661
Handling equipment 1463
Haricot bean
 canned, texture, *effect of* sodium chloride 1548
 characteristics 1546
 glycoprotein, insect amylase interaction 1547
 utilization 1546
Hazardous waste control 1710
Heat treatment
 effect on beef iron composition 1649
 canned liquid food 1452
 packaged liquid food 1452
 kiwi fruit juice processing 1698
 effect on tomato products amino acid 1574
Herring
 deterioration index 1681
 nitrogen 1681
Hexenol
 tea, formation 1700
 effect on tea flavour 1699
Histidine 1761
Homogenization
 milk heat stability 1614-5
Horse gram, aflatoxin determination 1542
Hydrocyanic acid
 cereal disinfection 1511
Hydrogenation, soyabean oil 1723-4
Hydroxycinnamic acid, antimicrobial activity 1501

- Immobilized enzymes, milk coagulation 1609
- Impedimetry, coliform detection 1491
- Industries
 - small scale 1445
 - village 1445
- Infant food
 - rheology 1748
- Inositol phosphate
 - bread 1523
 - wheat 1523
- Ion exchange application in food industry 1478
- Ion exchange resins, application in food processing 1482
- Iron
 - beef, composition
 - effect of heat 1649
 - effect of ascorbic acid 1649
 - breakfast cereal 1508
 - fruit preserves, composition 1576
 - potato 1567
- Iron-ascorbate complex 1473
- Irradiation
 - cereal, microbial infestation control 1510
 - food preservation 1502
 - potato
 - preservation 1570
 - sprouting inhibition 1570
 - wheat
 - effect on baking property 4521
 - effect on dough property 1521
 - yam 1570
- Ivy gourd, canning, tin free steel can suitability 1450
- Jaggery, shelflife, effect of sugar-cane acidity neutralization 1590
- Ketchup, rheology 1748
- Kinnow fruit
 - storage
 - gibberellic acid treatment 1581
 - packaging with wrapper 1581
- Kiwifruit
 - export 1578
 - market conditions in Japan 1578
- Kiwifruit juice
 - processing
 - by heat treatment 1698
 - by ultrafiltration 1698
- Lactobacillus acidophilus* growth, whey as medium 1639
- Lactose modification 1447
- Lamb, non-carcass component weights 1654
- Legislation, US, ion exchange resins in food processing 1482
- Legume, water diffusion, effect of temperature 1553
- Lemonade, sucrose 1693
- Leuconostoc oenos*, growth, effect of vitamin 1492
- Limnanthes* as industrial raw material 1549
- Linalool
 - tea 1700
 - effect on tea flavour 1699
- Lipase, *Fusarium solani*, production 1490
- Lipid
 - extract, cereals, fatty acid determination, HPLC 1532
 - wheat 1526
 - yeast
 - characteristics 1489
 - production 1489
- Loligo vulgaris* See squid
- Lunaria as industrial raw material 1549
- Lysine, cereal, quality, biological assay 1509
- Mackerel
 - deterioration index 1681
 - nitrogen 1681
- Madhuca fat, composition 1737
- Maize
 - ergosterol composition 1510
 - fungus development 1510
 - germ, extraction 1711
 - meal, fermented, Ghanaian
 - physicochemical property
 - effect of dehydration 1540
 - effect of soy flour 1540
 - protein quality
 - effect of dehydration 1540
 - effect of soy flour 1540
 - sensory property
 - effect of dehydration 1540
 - effect of soy flour 1540
 - microbial control
 - by chemical treatment 1510
 - by hot air drying 1510
 - by irradiation 1510
 - milling, moistured maize 1538
 - moistured, dry milling 1538
- Maize tortilla
 - aroma 1539
 - flavour 1539
 - texture 1539

- Malnutrition, biochemical study 1761
- Mango
 export 1578
 market conditions in Japan 1578
- Mango juice
 canning, tin free steel can
 suitability 1450
- Mango kernel fat, composition 1737
- Mango seed oil composition 1716
- Marketing, tropical fruits, Japanese 1578
- Meat
 emulsion formation under vacuum 1644
 identification
 electrophoresis 1643
 immunological method 1643
 phosphate
 antimicrobial activity 1496
 as ingredient 1498
 staphylococcal enterotoxin determination, immunosorbent assay 1647
- Meat protein, food emulsion stabilizer 1506-7
- Melon, quality 1588
- Mercury, marine organisms, determination 1682
- Methyl bromide, cereals disinfection 1511
- Methyl salicylate
 tea 1700
 effect on tea flavour 1699
- Mevalonic acid, grapefruit, biosynthesis 1579
- Microbial fat
 from yeast
 composition 1488
 production 1488
- Microbial genetics and phycotechnology 1483
- Microbiological evaluation 1484
 beef 1653
 fermented fish 1685
 fish
 CO₂ packaged 1684
 fermented 1685
 frankfurters, packaged 1669
- Microorganisms
 beef steak, aseptically packaged
 effect on colour 1652
 effect on odour 1652
 effect on pH 1652
- Microorganisms (contd.)
 Campylobacter jejuni, milk, isolation 1632
 Leuconostoc oenos growth, effect of vitamin 1492
 packaged pork
 effect of sanitizing 1658
 effect of washing 1658
 psychrotrophic bacteria, pork 1659
 Salmonella, milk, isolation 1633
 Staphylococcus aureus, whey
 enterotoxin production 1642
 growth 1642
 Streptococcus lactis growth in sterilized
 cow's milk 1634
 ewe's milk 1634
 Versinia enterocolitica food
 detection 1494
 enumeration 1494
- Microwave cooking 1448
 beef effect on iron composition 1649
 federal regulation 1448
 effect on ingredients 1448
 effect on microorganisms 1448
- Milk
 aseptically packaged, gelatinization 1606
 bovine
 fatty acid development 1613
 plasmin activity 1616
 proteose-pepton 1612
 Campylobacter jejuni isolation 1632
 chlordane residue 1626
 coagulation
 by chymosin 1609
 by pepsin 1609
 concentrated, heat stability 1615
 cow's, 'karadi', composition 1618
 cow's, sterilized,
 Streptococcus lactis
 acid production 1634
 growth 1634
 DDT residues 1626
 evaporated, gelation 1611
 ewe's, sterilized,
 Streptococcus lactis
 acid production 1634
 growth 1634
 fat 1693
 fatty acid determination 1620

Milk (contd.)

- fermented
 - acetaldehyde production 1630
 - flavour production 1630
 - goat's, fermentation 1627
 - heat stability
 - effect of homogenization 1614-5
 - hexachlorobenzene residues 1626
 - lipolysis 1613
 - nitrogen composition 1619
 - nitrogen flushing
 - effect on proteinase activity 1629
 - off-flavour 1628
 - pasteurized
 - shelflife 1607
 - plasmin activity 1616
 - polychlorinated biphenyl residues 1626
 - protease activity, measurement 1624
 - protein concentration 1619
 - proteinase
 - activity 1629
 - effect of nitrogen flushing 1629
 - deficient production 1631
 - raw, shelflife 1607
 - refrigerated, shelflife 1607
 - riboflavin determination, fluorometry 1621
 - Salmonella* isolation 1633
 - surface tension 1608
- ## Milk chocolate
- thiamin determination, HPLC 1598
- ## Milk powder, canning, tin free steel can suitability 1450
- ## Milk products
- aseptically packaged gelatinization 1606
 - butylated hydroxyanisole
 - determination, GC 1625
 - butylated hydroxytoluene determination, GC 1625
 - tert-butylhydroquinone determination, GC 1625
- ## Milk proteins
- proteinase deficient 1631
- ## Milling
- moistured maize 1538
 - wheat 1516-7
 - effect on deoxynivalenol 1527

Minerals

- cow pea, composition 1544
- soy flour
 - effect of baking 1557
 - effect of boiling 1557
 - effect of pH 1557
- wheat 1529
- wheat bran 1529
- Molasses residue, property 1589
- Monascus* pigment, red, water soluble, production 1504
- Monoterpene, biosynthesis in plants 1470
- Mustard, rheology 1748
- Mycotoxin, food, regulation 1771
- Myrothecium roridum*, sweet potato 1571

Nitrite

- antimicrobial activity 1495
 - protein bound 1471
- ## Nitrogen flushing
- milk proteinase activity 1629
- ## Noodle, texture 1605
- ## Nutrient, cooked pork 1657

Oat

- amino acid composition 1522
- effect of germination 1533
- prolamine electrophoretic pattern 1534
- protein, effect of germination 1533

Oil

- phospholipid changes, determination, Rod thin layer chromatography 1715
- Oleoresin, black pepper 1745
- Oligosaccharide, Nigerian cow pea 1543
- Olive oil stability effect of antioxidant 1718
- Orange juice composition 1697
- Orange oil concentrate
 - colour 1580
 - composition 1580
 - flavour 1580
 - preparation 1580
- Oregano, antioxidative effect 1739
- Oven, cooking, smoke free 1464

Packaged liquid food heating 1452

Packaging 1453

- aseptic
 - beef steak
 - colour effect of microorganisms 1652
 - odour effect of microorganisms 1652
 - pH effect of microorganisms 1652
 - milk, gelatinisation 1606

Packaging (contd.)

- beverage containers 1455,1692
- computer application 1454
- design and market strategy 1455
- waste problem in Japan 1456

Packaging materials 1453

- low density polyethylene bags, guava 1585

Paddy

- ergosterol composition 1510
- fungus development 1510
- microbial infestation control
 - by chemical treatment 1510
 - by hot air drying 1510
 - by irradiation 1510

Palm oil

- fatty acid composition 1719-20
- Malayasian, fatty acid composition 1719

Panicum miliaceum See proso millet

Papaya

- export 1578
- market conditions in Japan 1578

Paprika, colouring substance 1741

Patulin, effect of caffeine 1702

Peach slice, 'Clingstone', sterilization 1582

Pear slice, 'Bartlett', sterilization 1582

Pectin, effect of ethanol 1474

Penicillium digitatum, sweet potato 1571

Pepsin

- immobilization 1609
- milk, coagulation 1609

Pepper

- black, quality 1745
- cleanliness specification 1742
- dehydrated, green,
 - ascorbic acid 1744
 - folic acid 1744
 - sensory property 1744

Sri Lankan, composition 1743

Pergularia daemia seed oil composition 1716

Phenol, canola 1551

Phenolic oxidation, apple 1584

Phosphate

- antimicrobial activity 1496
- as ingredient in
 - baked goods 1497
 - beverages 1497
 - cereals 1497
 - dairy products 1498
 - fruits 1498
 - gels 1498

Phosphate (contd.)

- gums 1498
- meat 1498
- vegetables 1498

Phosphine, cereals, disinfestation 1511

Phosphoglucosylase, irradiated potato 1569

Phosphoglucose isomerase, irradiated potato 1569

Phosphorylase, irradiated potato 1569

Phycotechnology and microbial genetics 1483

Phytate

- proso millet 1535

Phytic acid

- food, determination, HPLC 1479
- zinc interaction 1472

Pickle

- sodium composition 1603
- acceptability 1603

Pimento, antioxidative effect 1739

Pizza shell

- browning, image analysis 1564

Piper nigrum See pepper

Plants, monoterpene biosynthesis 1470

Pollock

- minced patties, texture
 - effect of soy flour 1680
 - effect of soy protein concentration 1680
 - effect of sodium alginate 1680

Pollution control, United States 1710

Polychlorinated biphenyl residues

- determination, GC-MS 1756
- milk 1626

Polyol, effect on sheep 1505

Polyphenol oxidase, apple 1584

Pork,

- blood splashing, effect of stunning method 1655
- carcass
 - moisture loss during chilling 1656
 - muscle pH 1660
- cooked, nutrient composition 1657
- packaged, microorganisms
 - effect of sanitizing 1658
 - effect of washing 1658
- phosphate antimicrobial activity 1496
- psychrotrophic bacteria 1659
- staphylococcal enterotoxin determination, immunosorbent assay 1647

Potato

- amino acid composition
 - effect of cooking 1566
- canning, tin free steel can suitability 1450

Potato (contd.)

- iron availability 1567
- irradiated
 - enzymatic activity 1569
- irradiated
 - sugar composition 1569
- irradiation 1570
- 'Katahdin', amino acid composition
 - effect of cooking 1566
- 'Pontiac', amino acid composition
 - effect of cooking 1566
- preservation by irradiation 1570
- sprouting inhibition by irradiation 1570
- vitamin C loss
 - effect of cooking 1568
 - effect of storage 1568
- Pouches 1457
- Poultry meat, phosphate antimicrobial activity 1496
- Preservation
 - food by irradiation 1502
 - potato by irradiation 1570
- Preserves
 - canned
 - iron composition 1576
 - tin composition 1576
- Prolamine, oat electrophoretic pattern 1534
- Propyl gallate, effect on soyabean oil flavour stability 1713
- Proso millet
 - phytate composition 1535
 - tannin composition 1535
- Protease activity, milk, measurement 1624
- Protease peptone, bovine milk 1612
- Protein
 - barley 1541
 - cereal, quality, biological assay 1509
 - ham, modification during maturation 1663
 - methionine determination, GLC 1762
 - methionine sulfoxide determination, GLC 1762
 - modification 1447
 - nitrite 1471
 - nutritive value, effect of aflatoxin contamination 1772
 - quality evaluation 1763
 - rabbit, effect of storage 1666
 - whey 1636
- Pseudomonas*, milk, protease activity, effect of nitrogen flushing 1629

- Pyrethroid, wheat pest control 1531
- Pyridoxamine, food, degradation during thermal processing 1764
- Pyridoxine, food, degradation during thermal processing 1764
- Pyridoxal, food, degradation during thermal processing 1764
- Pyrophosphate, grapefruit, biosynthesis 1579
- Rabbit
 - carcass traits 1665
 - protein
 - enzymatic activity effect of storage 1666
 - structure effect of storage 1666
- Ragi, carbohydrate isolation 1545
- Rapeseed
 - carbohydrate composition 1551
 - phenolic composition 1551
- Rennet
 - skim milk coagulation inhibition
 - by chelating agent 1610
 - by fatty acid 1610
- Rennet curd
 - property 1635
 - structure 1635
- Rheology
 - apple sauce 1748
 - infant food 1748
 - ketchup 1748
 - salad dressing 1749
- Rhizoctonia solani*, sweet potato 1571
- Rhodotorula glutinis* See yeast
- Rhyzopertha dominica*
 - sorghum infestation
 - control by
 - fenitrothion + bioresmethrin 1537
 - primiphos methyl + carbaryl 1537
- Riboflavin, milk, determination, fluorometry 1621
- Rice
 - cooked, capsule packed
 - freezing 1512
 - cooked, hardness 1513
 - cooking time 1513
- Rice bran oil
 - fatty acid, refining
 - by alcohol extraction 1515
 - by alkali neutralization 1515
 - refining
 - by alcohol extraction 1515
 - by alkali neutralization 1515
- Rice flake, capsule packed freezing 1512
- Rice flour, cake baking 1514

- Rockfish
 - minced
 - nutritive value, effect of washing 1687
 - quality, effect of washing 1687
- Rosemary, antioxidative effect 1739
- Rye, amino acid composition 1522
- Saffron, utilization 1740
- Sage, antioxidative effect 1739
- Salad dressing, rheology 1749
- Salmonella*
 - beef, isolation 1653
 - fermented fish 1685
 - milk, isolation 1633
- Salt 1758
- Samai starch digestibility 1593
- San Simon cheese See cheese
- Sanwa starch digestibility 1593
- Sausage
 - Clostridium botulinum* isolation 1646
 - emulsion formation under vacuum 1644
 - soy protein emulsifying capacity 1645
 - texture, effect of soy protein 1645
- Sensory evaluation
 - dehydrated green pepper 1744
 - fish, CO₂ packaged 1684
- Sesame flour
 - characteristics 1552
 - composition 1552
- Sesame protein
 - characteristics 1552
 - composition 1552
- Sesame seed oil
 - fatty acid composition 1721
 - triglyceride composition 1721
- Sesquiterpene, grapefruit, biosynthesis 1579
- Sheep, effect of polyol 1505
- Shellfish
 - paralytic shellfish poisoning, toxin determination, HPLC and AOAC mouse bioassay 1688
- Shellfish products
 - contamination 1685-6
 - safety 1685-6
- Shrimp processing, water-reuse 1689
- Single cell protein
 - nutritive value 1486
 - process technology 1486
 - safety 1486
- Sitaphal See custard apple
- Sitophilus oryzae*, sorghum infested, control by
 - fenitrothion + bioresmethrin 1537
 - pirmiphos methyl + carbaryl 1537
- Skim milk
 - coagulation
 - by chymosin 1609
 - by pepsin 1609
 - coagulation inhibition
 - by chelating agent 1610
 - by fatty acid 1610
 - surface tension 1608
- Small and village industries 1445
- Sodium
 - bread acceptability 1603
 - cottage cheese acceptability 1603
 - pickel acceptability 1603
- Sodium alginate
 - effect on minced fish patties texture 1680
- Sodium chloride
 - antimicrobial activity 1495
 - safety 1495
 - effect on canned harricot bean texture 1548
- Soft drinks, can 1694
- Solar drying, agricultural products 1459
- Solar energy storage 1468
- Solvent extraction process amine derivatives 1712
- Sopubia dulphinifolia* seed oil composition 1716
- Sorghum
 - cultivar evaluation by electrophoresis 1536
 - malathion resistant pest control 1537
- Soyabean
 - amino acid composition 1522
 - composition 1725
 - chymotrypsin inhibitor 1555
 - extraction 1711
 - storage stability 1725
 - trypsin inhibitor 1555
 - water diffusion, effect of temperature 1553
- Soyabean oil
 - fatty acid composition 1726
 - flavour 1727
 - flavour stability
 - effect of butylated hydroxyanisole 1713
 - effect of butylated hydroxytolulene 1713
 - effect of propyl gallate 1733
 - effect of tertiary butylated hydroxyquinone 1713

Soyabean oil (contd.)

hydrogenation 1723-4

Soy flake, alcohol extraction 1722

Soy flour

carbohydrate composition 1556

fermented maize meal

effect of physicochemical property 1540

effect on protein quality 1540

effect on sensory property 1540

effect on minced fish patties

texture 1680

mineral

effect of baking 1557

effect of boiling 1557

effect of pH 1557

Soy protein

aggregation by sonication 1554

food emulsion stabiliser 1506-7

effect on minced fish patties

texture 1680

sausage emulsifying capacity 1645

Spice oil, antimicrobial effects 1738

Spices

antimicrobial effects 1738

antioxidative effects 1739

microbial contamination 1738

Spinach, heat processed, chlorophyll degradation 1565

Squid, frozen-stored, texture 1690

Staphylococcal enterotoxin

meat, determination, immunosorbent assay 1647

Staphylococcus

characterisation 1493

fermented fish 1685

Staphylococcus aureus

beef, isolation 1653

effect of butylated hydroxyanisole 1499

whey

enterotoxin production 1642

growth 1642

Starch

alkali gelatinization 1592

banana, changes during ripening 1578

damage 1591

samai, digestibility 1593

sanwa, digestibility 1593

wheat 1518

Stemphylium botryosum, sweet potato 1571

Sterigmatocystin, effect of caffeine 1702

Sterilization

'Bartlett' pear slice 1582

'Clingstone' peach slice 1582

cow's milk, *Streptococcus lactis*

acid production 1634

growth 1634

ewe's milk, *Streptococcus lactis*

acid production 1634

growth 1634

high vacuum flame sterilization,

fruit slices 1582

Storage

bakery products 1599

crumpet 1599

kinnow fruit effect of gibberellic acid 1581

effect on potato vitamin C 1568

Strawberry

sugar composition during thawing 1577

Streptococcus lactis

acid production in sterilized

cow's milk 1634

ewe's milk 1634

growth in sterilized

cow's milk 1634

ewe's milk 1634

Sucrose, strawberry composition during thawing 1577

Sucrose, phosphate synthase irradiated potato 1569

Sucrose synthase

irradiated potato 1569

Sugar

frozen strawberry, composition 1577

Sugarcane juice

neutralization effect on jaggery

shelflife 1590

Sunflower meal, whippability 1559

Sunflower seed processing 1558

Sweet potato

fungal pathogenicity 1571

microbiological evaluation 1571

Tamarind kernel oil

fatty acid composition 1728

Malagatian, composition 1728

sterol composition 1728

Tannin, proso millet 1535

Tea

ethylamine determination, HPLC 1701

flavour, effect of processing 1699

volatile compound formation 1700

Terpene

grapefruit, biosynthesis 1579

- Tertiary butylhydroquinone
 antimicrobial activity
 effect of casein 1500
 effect of maize oil 1500
 milk products, determination,
 GC 1625
 effect on soyabean oil flavour
 stability 1713
- Texture
 canned harrirot bean, effect of
 sodium chloride 1548
 frankfurters 1670
 maize tortialla 1539
 mechanical signals 1753
 noodle 1605
- Thawing, frozen strawberry, sugar com-
position 1577
- Thermal processing
 food 1449
 frankfurters, weight loss 1667
- Thiamin, milk chocolate, determina-
tion, HPLC 1598
- Thyme antioxidative effect 1739
- Tin, fruit preserves composition 1576
- Tin free steel can, canning, processed
food products 1450
- Tinplate can
 pitting 1451
- Tocopherol
 effect on turkey meat
 lipolysis 1673
 oxidation 1673
- Toffee-caramel fat 1595
- Tofu, yersiniosis 1769
- Tomato
 composition 1573
 'Marglobe', composition 1573
 'pusa ruby', composition 1573
 'Roma red plum', composition 1573
- Tomato paste
 amino acid composition effect of
 heating 1574
- Tomato products, amino acid composi-
tion effect of heating 1574
- Tomato pulp, amino acid composition,
effect of heating 1574
- Tomato puree, amino acid composition
effect of heating 1574
- Tribolium castaneum*
 cereal
 protein quality evaluation 1509
 lysine quality evaluation 1509
 sorghum infested, control
 by fenitrothion + bioresmethrin
 1537
 by primiphos methyl + carbaryl 1537
- Tribolium confusum*
 effect of growth regulator 1755
- Triglyceride 1729
- Trypsin inhibitor
 soyabean 1555
- Turbot
 minced patties, texture
 effect of soy flour 1680
 effect of soy protein concentrate
 effect of sodium alginate 1680
- Turkey meat
 lipolysis
 effect of dietary fat 1673
 effect of tocopherol 1673
 oxidation
 effect of dietary fat 1673
 effect of tocopherol 1673
- UDP-Glucose-pyrophosphorylase irradiated
potato 1569
- Ultrafiltration
 dairy industry 1462
 kiwifruit juice processing 1698
- Vegetables
 chlorophyll degradation 1565
 phosphate as ingredient 1498
- Vibrio*, fermented fish 1685
- Video image analysis system, beef carcass
evaluation 1651
- Vigna sinensis* See cow pea
- Vigna unguiculata* See cow pea
- Village and Small industries 1445
- Vitamin
 effect on leuconostoc growth 1492
- Vitamin B₆, determination 1765
- Vitamin C
 cow pea composition 1544
 potato
 effect of cooking 1568
 effect of storage 1568
- Waste
 solid and hazardous waste control
 1710
- Waste generation
 process and in-plant control 1710
- Waste water treatment 1710
- Water activity
 canned food 1477
 cheese 1641
 food 1476
- Wax, analysis 1732
- Weighing,
 egg 1674

Wheat

- amino acid composition 1522
- bread-baking quality 1519
- carbonyl residue determination, HPLC 1530
- deoxynivalenol (vomitoxin),
 - effect of bread baking 1527
 - effect of milling 1527
- germination
 - effect on bread baking 1524
 - effect on crumb firmness 1524
 - effect on flour 1524
- irradiation
 - effect on baking 1521
 - effect on dough 1521
- lipids 1526
- milling 1516-7
- organophosphorothioate as pesticide 1531
- pyrethroid as pesticide 1531
- starch extrusion 1518

Wheat bran, mineral composition 1529

Wheat flour

- dough, varietal difference 1528
- gluten protein 1528
- glutenine, bread-making quality 1528
- inositol phosphate 1523
- mineral composition 1529

Wheat malt

- use in bread making 1520
- amylolytic activity
 - effect of germination 1520
 - effect of gibberellic acid 1520
- proteolytic activity
 - effect of germination 1520
 - effect of gibberellic acid 1520
- wort quality
 - effect of germination 1520
 - effect of gibberellic acid 1520

Whey

- freeze concentration 1638
- Lactobacillus acidophilus* growth 1639
- Staphylococcus aureus*
 - enterotoxin production 1642
 - growth 1642

Whey protein

- determination, HPLC 1637
- fractionation 1636
- recovery 1636

Wine

- analysis 1704
- Bardeaux, quality 1705
- flavour, effect of microorganisms on cork 1707
- effect of microorganisms on cork 1707-8
- sensory evaluation 1706

Yam

- preservation by irradiation 1570

Yeast

- fat
 - composition 1488
 - production 1488
- grape 1487
- lipid
 - characteristics 1489
 - production 1489

Yersinia enterocolitica

- food
 - detection 1494
 - enumeration 1494
- yersinosis 1769

Zinc

- food, availability 1757
- phytic acid interaction 1472

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I N D E X

- Abelmoschus esculentus See okra
- 2-Acetyl-1,4,5,6-tetrahydropyridine
See flavour compounds
- 2-Acetyl-3-hydroxyfuran isomaltol See
flavour compounds
- 2-Acetyl pyrazine See flavour
compounds
- 2-Acetyl pyridine See flavour
compounds
- Acorn hull
cellulose composition 1853
hemicellulose composition 1853
lignin composition 1853
- Acoustical property, monosaccharide
solution 1909
- Additives, food 1804
- Adulteration
beef by
cardiac muscle 1954
defatted tissue 1954
soyflour 1954
ghee, detection by
crystallization 1936
GC 1936
meat, detection by phosphate 1950
vanaspati, by animal fat, detec-
tion 2028
- Aflatoxin 2048-9
cottonseed, decorticated 1854
determination 2050
groundnut, extraction
effect of methanol 1863
effect of methanol-water
solvent: groundnut ratio 1863
groundnut products 1862
maize, inhibition 1837
- Aflatoxin M₁
milk, contamination, 1933
determination, LC 1934
- Agaricus bisporus See mushroom
- Agricultural industry, economic
evaluation 1775
- Alcohol
Kumquat, composition 1899
sherry 2006
- Aldehyde, Kumquat, composition 1899
- Algal protein diet effect on rat 1802
- Alkali treatment, effect on protein
2037
- Allium schoenoprasum See chive
- Almond seeds
cyanide composition 1886
cyanogenic glycoside composition 1886
- Amine, soy sauce, determination, TLC 1858
- Amino acid, jelly fish 1988
- Amla preserve, β -carotene retention 1867
- Amylase
Bacillus stearothermophilus effect of
UHT sterilization 1796
cereals, measurement, nephelometry
1812
- Anaerobes in cannery cooling water 1800
- Analytical technique
gas chromatography 1790
gas liquid chromatography 1790
atomic absorption spectroscopy 1790
- Anilide, salad oil, determination 2014
- Antimicrobial activity
Centratherrum anthelminticum oil 2018
- Antioxidant
benzylphenol 1805
determination, HPLC 1806
- Aonla preserve quality, effect of aonla
maturity 1906
- Apple
aroma determination, GLC 1905
'Golden-Delicious', fungal infestation
control by benlate 1906
'Red Delicious' polyphenol oxidase 1904
seeds
cyanide composition 1886
cyanogenic glycoside composition 1886
- Arachis hypogaea* See groundnut
- Aroma
apple, determination, GLC 1905
cooked dried mushroom 1803
- Asbestos, food contamination 2042
- Ascorbic acid
degradation in dehydrated sweet potato
1874
food, determination, LC 1793
fruits, Nigerian 1885
effect on canned mung bean organolep-
tic property 1852
vegetables, Nigerian 1885
- Aspergillus*, cereals contamination 1814
- Aspergillus niger*, aflatoxin inhibition in
maize 1837
- Atomic absorption spectroscopy 1790
- Automatic moisture controller for grain 1785

Avocado

browning potential 1903
carotenoid composition 1903
enzymatic activity 1903

Bacillus, buffalo's milk, isolation
1931

Bacillus cereus, whipped potato 1872

Bacillus stearothermophilus, amylase,
effect of UHT sterilization 1796

Bacon

cooking, effect on mutagen forma-
tion 1971
cured, N-nitrosothiazolidine
formation 1973
mutagen formation, effect of cook-
ing 1971

Staphylococcus aureus

enterotoxin production 1972
growth 1972

Baker's yeast quality 1801

Baking, effect on potato, nitrogenous
compounds 1870

Barley

citrinin determination 1835
TLC 1836

Beef

adulteration - detection

cardiac muscle 1954
defatted tissue 1954
soy flour 1954

heart, chilled

organoleptic property 1957
weight loss 1957

heart frozen

organoleptic property 1957
weight loss 1957

kidney, organoleptic property,

effect of freezing 1956

liver, chilled

organoleptic property 1957
weight loss 1957

liver, frozen

organoleptic property 1957
thermal conductivity 1955
weight loss 1957

liver, organoleptic property

effect of freezing 1956

muscle

binding capacity
effect of phosphate 1958
cohesiveness effect of phosphate
1958
lipid oxidation, determination,
TBA method 1963

Beef (contd.)

palatability 1959

salmonella heat resistance, effect of
soy protein 1961

steak, pre- and post-rigor,

effect of mixing time 1962

effect of salt level 1962

effect of temper time 1962

tissue

Escherichia coli growth 1960

Salmonella typhimurium growth 1960

Beer

ethanol determination, GC 2007

nitrosamine determination, chromato-
graphy 2008

Belly, processed, property 1970

Benalate, apple, 'Golden Delicious',
fungal infestation control 1906

Benzyladenine, effect on brocolli colour
1879

Benzylphenol as antioxidant 1805

Beverage, chufa, rheology 1875

Biscuit consumption 1914

Black bean See French bean

Blackcurrant syrup colour deterioration
1998

Blood, chemical residue, determination
1787

Blood plasma

meat product 1951

Blood serum

DDT residue

cleanup 1993

extraction 1993

polychlorinated biphenyl residue

cleanup 1993

extraction 1993

Blueberry

ethanol production

effect of carbondioxide 1887

effect of nitrogen 1887

mineral composition 1888

quality

effect of carbondioxide 1887

effect of nitrogen 1887

vitamin composition 1888

Botrytis control in grape by dicar-
boxide fungicide 1894

Bovine

carcass refrigeration

effect of conformation 1952

effect of fattening 1952

effect of weight 1952

muscle, myofibrillar protein titin de-
gradation, effect of storage 1953

- Bran, naphthelene determination, GC 1823
- Brassica campestris* See rapeseed
- Brassica juncea* See mustard
- Bread
- dough processing 1822
 - gluten moisture 1916
 - Middle Eastern, characterisation and composition
 - effect of sodium bicarbonate 1919
 - phytic acid composition
 - effect of sodium bicarbonate 1919
 - regulation 1794
 - rye's, flavour compound determination, column and HPLC 1918
 - spoilage determination, DSC 1917
 - starch moisture composition 1916
 - wheat dough processing 1822
- Broccoli
- colour
 - effect of benzyldenine 1879
 - effect of icing 1879
 - shelflife
 - effect of benzyldenine 1879
 - effect of icing 1879
 - storage 1879
- Broiler meat composition
- effect of coating 1980
 - effect of cooking 1980
- Browning
- avocado 1903
 - grape 1892
 - potato 1869
- Brussels sprout, peroxidase isolation 1877
- Butter, hydrolytic rancidity, off-flavour determination 1937
- Butylated hydroxyanisole effect on palm olein deterioration 2020
- Butylated hydroxytoluene effect on palm olein deterioration 2020
- Byproduct, vegetable oil refinery, organohalogen residue determination 2013
- Cabbage, peroxidase isolation 1877
- Cadmium, meat contamination 1949
- Calcium, effect on canned mung bean organoleptic property 1852
- Calodendrum capense* oil, fatty acid composition 2016
- Camelina sativa* oil, determination, chromatography 2015
- Camellia sinensis* See tea
- Campylobacter jejuni*, chicken, eviscerated
- effect of incubation 1979
 - effect of pH 1979
 - effect of temperature 1979
- Can
- Japanese metal can industry 1778
 - welded OTS can 1777
- Cancer 2041
- Canned
- fish, lead determination AAS 1984
 - okra
 - effect of maturity 1884
 - effect of processing 1884
- Cannery cooling water
- anaerobes 1800
- Canning
- mandarin 1900
 - tomato, USDA raw-pack process 1880
- Canola oil extraction 2017
- Carbondioxide
- effect on blueberry ethanol production 1887
 - effect on blueberry quality 1887
 - effect on grape quality 1891
- Carcass
- bovine, refrigeration
 - effect of conformation 1952
 - effect of fattening 1952
 - effect of weight 1952
- β -carotene
- amla preserve 1867
 - carrot preserve 1867
 - degradation in dehydrated sweet potato 1874
- Carotenoid, avocado 1903
- Carrot preserve, β -carotene retention 1867
- Casein
- isolation by
 - cryodestabilization 1927
 - ultrafiltration 1927
- Castanea sativa* See chestnut
- Catalase, avocado 1903
- Cellulose
- acorn hull 1853
 - chestnut hull 1853
 - coconut hull 185
 - groundnut hull 1853
 - hazelnut hull 1853
 - pumpkin seed 1853
 - sunflower seed 1853
- Centratherum anthelminticum* oil
- antimicrobial activity 2018
 - fatty acid composition 2018

- Cereal flour, nutritional quality, effect of milling 1816
- Cereal product, mycotoxin 1813
- Cereals
- amylase activity, measurement, naphelometry 1812
 - methyl bromide fumigation 1815
 - microbial quality 1814
 - mycotoxin 1813
- Cheese
- brine microfiltration 1938
 - cheddar
 - flavour 1940
 - nutritional quality 1941
 - Domiati, *Staphylococcus aureus* growth 1943
 - survival 1943
 - fabricated, nutritional quality 1941
 - flavour 1939
 - phosphorus determination 1792
 - ripening by proteinase 1945
 - Romano-type cheese, salting 1942
 - Staphylococcus aureus* growth 1944
 - Staphylococcus aureus* toxin production 1944
 - texture 1939
 - traditional, nutritional quality 1941
- Cherry seed
- cyanide composition 1886
 - cyanogenic glycoside composition 1886
- Chestnut
- cellulose composition 1853
 - hemicellulose composition 1853
 - lignin composition 1853
- Chicken, eviscerated, *Campylobacter jejuni* recovery 1979
- Chilled
- beef heart
 - organoleptic property 1957
 - weight loss 1957
 - beef liver
 - organoleptic property 1957
 - weightloss 1957
- Chilli, Hungarian, zearalenone 2030
- Chinese tallow fruit lipid composition 1908
- Chitin, effect on tomato seed protein concentrate 1882
- Chive oil
- flavour compound
 - characterization 1866
 - isolation 1866
 - separation 1866
- Chlorinated compound
- in blood, determination 1787
 - in fat, determination 1787
 - in tissue, determination 1787
- Chlorophyllian pigment in dried parsley 1878
- Chlorpyrifos residue in 'Sultana' grape 1895
- Chocolate 1913
- consumption 1914
 - role of potassium 1915
 - role of sodium 1915
- Chromium 2040
- Chufa
- beverage, rheology 1875
 - extract
 - colour 1876
 - turbidity 1876
- Cinnamon contaminant 2029
- Citric acid, effect on canned mung bean organoleptic property 1852
- Citrinin
- barley 1835
 - determination, TLC 1836
 - cereal, and cereal product 1813
 - groundnut 1835
 - maize 1835
 - determination, TLC 1836
- Citrus peel
- microbial biomass product, production by fermentation 1898
- Citrus reticulata* See mandarin
- Clarification, pear juice by ultrafiltration 1997
- Cleaning
- egg breakage 1981
- Clostridium botulinum*, radiation injured 2044
- Coagulant, effect on tomato protein concentrate 1881-2
- Coagulation, effect on tomato protein concentration 1881-2
- Coconut
- cellulose composition 1853
 - hemicellulose composition 1853
 - lignin composition 1853
- Cocos nucifera* See coconut
- Coffee
- freezing point depression 1788
 - water activity 1788
- Collagen, jellyfish 1988
- Collection, egg breakage 1981

Colour

- beef heart
 - chilled 1957
 - frozen 1957
- beef liver
 - chilled 1957
 - frozen 1957
- blackcurrant syrup 1998
- canned mung bean
 - effect of ascorbic acid 1852
 - effect of calcium 1852
 - effect of citric acid 1852
 - effect of EDTA 1852
- D&C green No.5, determination, LC 1810
- dried parsley 1878
- sausage 1974

Computer

- application in confectionery research 1912

Confectionery

- regulation 1794
- research, Computer's application 1912
- sugar confectionery consumption 1914
- industry 1913

Confectionery fat

- from sal seed 3027
- from mowrah 2027

Contamination

- cinnamon 2029
- food
 - by asbestos 2042
 - by cyclopiazonic acid 2043

Convection heating, spaghetti

- effect on organoleptic property 1921

Cooking

- effect on bacon mutagen formation 1971
- effect on broiler meat composition 1980
- effect on pork roast 1967

Copper 2040

Corylus avellana See hazelnut

Cottonseed, decorticated, aflatoxin 1854

Cowpea flour

- protein nutritional quality
 - effect of moisture 1847
 - effect of temperature 1847
- trypsin inhibitor activity
 - effect of moisture 1847
 - effect of temperature 1847

Cryodestabilization, casein isolation 1927

Cryptococcus laurentii See yeast

Crystallization, ghee adulteration detection 1936

Cucurbita pepo See pumpkin

Cultivar, pecan kernel colour 1864

Cyclopiazonic acid, food contamination 2043

Cyperus esculentus See chufa

DDT residue

- blood serum
 - cleanup 1993
 - extraction 1993
- human milk
 - cleanup 1993
 - extraction 1993

Deer meat, muscle lipid oxidation, determination, TBA method 1963

Dehydrated

- okra quality, effect of variety 1883
- sweet potato
 - ascorbic acid degradation 1874
 - β -carotene degradation 1874

Dehydration

- fruit 1842
- potato browning 1869
- vegetable 1842

Deoxynivalenol

- maize 1838
 - determination, TLC 1825
- wheat, determination, TLC 1825-7

Dialysis, pure- culture process lactic acid fermentation of vegetable 1865

Dicarboxide See fungicide

Diet, ragi husk incorporation 1830

Dietary fibre

- nut 1853
 - physiological effect 2039
- 2,5-diethyl-1,2,4-trithiolane See flavour compound
- 6,7-dihydro-5-methyl-(5H)-cyclopentapyrazine See flavour compound

Dipropyl disulphide See flavour compound

Disease, egg breakage 1981

Dough

- sorghum, texture 1833
- wheat, processing for bread 1822

Dried mushroom

- aroma volatile 1803

Dried parsley

- chlorophyllian pigment composition 1878
- colour analysis 1878

- Grape (contd.)
 'zinfandel' naphthalene acetic acid residue 1897
- Grape vine
 composition
 effect of crop thinning 1890
 effect of irrigation 1890
 effect of potassium 1890
- Great Northern bean See french bean
- Green bean See french bean
- Green gram, oligosaccharide effect of irradiation 1850
- Groundnut
 aflatoxin extraction
 effect of methanol 1863
 effect of methanol-water solvent: groundnut ratio 1863
 cellulose composition 1853
 citrinin detection 1835
 hemicellulose composition 1853
 lignin composition 1853
- Groundnut products
 aflatoxin 1862
- Growth stimulation, yoghurt 1935
- Guanidinium hydrochloride
 mustard protein denaturation 1856
 rapeseed protein denaturation 1856
- Ham
 composition
 effect of potassium sorbate 1969
 effect of vacuum packaging 1969
 organoleptic property
 effect of potassium sorbate 1969
 effect of vacuum packaging 1969
 processed
 chemical property 1970
 physical property 1970
 organoleptic property 1970
 yield
 effect of potassium sorbate 1969
 effect of vacuum packaging 1969
- Handling, egg breakage 1981
- Hazelnut hull
 cellulose composition 1853
 hemicellulose composition 1853
 lignin composition 1853
- Heat conduction
 food freezing 1780-81
 computerized 1781
- Helianthus annuus* See sunflower seed
- Hemicellulose
 acorn hull 1853
 chestnut hull 1853
- Hemicellulose (contd.)
 coconut hull 1853
 groundnut hull 1853
 hazelnut hull 1853
 pumpkin seed 1853
 sunflower seed 1853
- Hibiscus esculentus* See okra
- Histamine
 mackerel, effect of storage temperature 1986
 skipjack tuna, effect of storage temperature 1986
 soy sauce, determination, TLC 1858
- Homogenization process 1782
- Horchata* See chufa
- Horse bean
 protein, plastein gel formation 1851
- Human milk
 DDT residue
 cleanup 1993
 extraction 1993
 polychlorinated biphenyl residue
 cleanup 1993
 extraction 1993
- Hydrogenation, vegetable oil 2011
- Hydrolysis, rapeseed protein nutritional quality improvement 1857
- Hypercholesterolemia, effect of faba bean protein 1849
- Ice-cream
 icy texture 1946
 ingredient 1946
 labelling 1946
 manufacture, quality control 1947
 marketing 1946
 milk composition 1946
 organoleptic property 1946
 quality 1946
 recrystallization
 effect of locust bean gum 1809
 effect of sweetening agent 1809
- Icing
 effect on broccoli
 colour 1879
 shelflife 1879
- Impedimetry, milk, microorganism determination 1932
- Industry
 agricultural, economic evaluation 1775
 food, economic evaluation 1778
 sugar confectionery industry 1913

- Infant food
 - DDT residue
 - cleanup 1993
 - extraction 1993
 - heavy metal 1994
 - pesticide residue 1994
 - polychlorinated biphenyl residue
 - cleanup 1993
 - extraction 1993
- Insecticide residue
 - 'Sultana' grape 1895
- Irradiation
 - effect on green gram oligosaccharide 1850
- Jellyfish
 - amino acid composition 1988
 - collagen 1988
- Katsuwonus pelamis* See Skipjack tuna
- Ketone, Kumquat, composition 1899
- Kumquat, essential oil composition 1899
- Lactic acid, vegetable fermentation
 - by dialysis pure-culture process 1865
- Lactobacillus*, milk 1930
- Lactose
 - hydrolysis
 - in expanded bed reactor 1798
 - in fixed bed reactor 1798
- Lamb
 - acceptability effect of vacuum packaging 1964
 - lipid oxidation during storage 1965
 - organoleptic property
 - effect of vacuum packaging 1964
 - effect of yeast growth 1966
 - stored, lipid oxidation 1965
- Lead
 - canned Portuguese fish, AAS 1984
 - meat contamination 1949
- Leavening agent, sodium bicarbonate
 - effect on bread 1919
- Leuconostoc* salt-tolerant, milk 1930
- Lignin
 - acorn hull 1853
 - chestnut hull 1853
 - coconut hull 1853
 - groundnut hull 1853
 - hazelnut hull 1853
 - pumpkin seed 1853
 - sunflower seed 1853
- Limonin
 - orange juice, determination, HPLC 1995
 - mandarin juice, determination, GC 1996
- Limulus* amoebocyte lysate assay, milk quality 1924
- Lipid 2021
 - Chinese tallow fruit 1908
 - oxidation in stored lamb meat 1965
 - oxidation in potato chip 1873
 - sunflower seed 1860
 - wheat, composition effect of germination 1820
- Lipolysis, milk and milk products 1925
- Locust bean gum effect on ice recrystallization 1809
- Mackerel, histamine formation 1986
- Maize
 - aflatoxin inhibition 1837
 - citrinin determination 1835
 - TLC 1836
 - deoxynivalenol
 - determination, TLC 1825
 - production 1838
 - starch, phosphorus determination 1792
- Maize flour 1839
 - nutritional quality, effect of milling 1834
- Maize (based) fortified food, property 1840
- Malathion residue, grape 1895
- Malt, nitrosodimethylamine determination 2009
- Malus domestica* See apple
- Mandarin, canning 1900
- Mandarin juice, limonine determination, GC 1996
- Manganese 2040
- Mango kernel fat use in confectionery 2027
- Mango slice, salt-treated, storage
 - polyethylene pouches 1901
- Monosaccharide solution, acoustical characteristics 1909
- Maple syrup
 - cane sugar determination, spectrometry 1999
 - corn syrup determination, spectrometry 1999
- Measuring device 1784
- Meat
 - adulteration detection by phosphate 1950
 - microbiological evaluation 1948
 - muscle
 - binding capacity
 - effect of phosphate 1958
 - cohesiveness
 - effect of phosphate 1958

- Meat (contd.)
 - spoilage, review 1948
- Meat product
 - blood plasma analysis 1951
 - contamination
 - cadmium 1949
 - lead 1949
 - phosphorus determination 1792
- Mechanically deboned poultry
 - meat, utilization 1979
- Methoxyl pectin utilization in
 - agro-food industry 1789
- Methylbromide, cereal fumigation 1815
- Methyl pentyl disulphide See
 - flavour compound
- 2-methyl-3-ethylpyrazine See
 - flavour compound
- 3-methyl-3-hydroxy-pyran-4-one (maltol) See
 - flavour compound
- Microbial biomass product
 - from citrus peel, production by fermentation 1898
- Microbial quality
 - ham
 - effect of potassium sorbate 1969
 - effect of vacuum packaging 1969
 - lamb effect of vacuum packaging 1964
 - preserved food 1786
- Microbiological evaluation 1795
 - cereal 1814
 - shellfish 1989
- Microorganism, milk, impedimetric determination 1932
- Microwave cooking
 - effect on broiler meat composition 1980
 - effect on pork roast 1967
 - spaghetti effect on organoleptic property 1921
- Milk
 - aflatoxin M₁ contaminated determination, LC 1934
 - Bacillus isolation 1931
 - buffalo's, Bacillus isolation 1931
 - fortified
 - vitamin A determination, LC 1929
 - vitamin D determination, LC 1929
 - lipolytic changes 1925
 - mesophilic count, determination, impedimetry 1932
 - off-flavour, light induced 1923
- Milk (contd.)
 - pasteurized, quality determination, limulus amebocyte lysate assay 1924
 - proteolysis determination spectrophotometry 1926
 - psychotropic count determination, impedimetry 1932
 - quality determination, limulus amebocyte lysate assay 1924
 - salt-tolerant lactic acid bacteria 1930
- Milk powder
 - fortified
 - vitamin A determination, spectrophotometry 1928
 - vitamin E determination, spectrophotometry 1928
 - lipolysis
- Milk protein, proteolysis determination, spectrophotometry 1926
- Millet, goitrogenic 1829
- Milling
 - effect on cereal flour nutritional quality 1816
 - effect on maize flour nutritional quality 1834
 - effect on sorghum flour nutritional quality 1834
- Mineral, blueberry, composition 1888
- Moisture
 - bread
 - gluten 1916
 - starch 1916
 - control in grain 1785
 - effect on cowpea flour
 - protein nutritional value 1847
 - trypsin inhibitor activity 1847
- Molybdenum 2040
- Mowrah fat use in confectionery 2027
- Mukand wadian See
 - savoury food
- Mung bean
 - canned, organoleptic property
 - effect of ascorbic acid 1852
 - effect of calcium 1852
 - effect of citric acid 1852
- Mushroom
 - aroma 1803
 - glucosinolate 1803
- Mustard
 - protein denaturation
 - by guanidinium hydrochloride 1856
 - by urea 1856
 - protein effect of sodium dodecyl sulphate 1855
- Mutagen, bacon effect of cooking 1971

Mycotoxin

cereal 1813-4

product 1813

Myofibrillar protein titin bovine,
effect of storage 1953

Naphthalene

bran, determination, capillary GC
1823

wheat germ, determination, capillary GC 1823

Navy bean See french bean 1846

Niacin See vitamin B

Nickel 2040

Nitrogen

effect on blueberry

ethanol production 1887

quality 1887

effect on grape quality 1891

Nitrogenous compound

potato

effect of baking 1870

effect of frying 1870

Nitroschlorination, fatty acid 2025

Nitrosamine, beer, determination,
chromatography 2008

Nitrosodimethylamine, malt, determination 2009

Nitrosothiazolidine, cured meat 1973

Nutmeg, contamination 2029

Nutrient, pork 1968

Nutritional value

maize based fortified food 1840

rapeseed protein, improvement

by hydrolysis 1857

by ultrafiltration 1857

sorghum flour, effect of milling
1831

Ochratoxin A

wheat, determination, enzyme linked-immunosorbent assay 1824

Odour

beef heart

chilled 1957

frozen 1957

beef liver

chilled 1957

frozen 1957

clingstone peach, high vacuum
flame sterilized 1902

Oil

vegetable

fatty acid determination, GLC 2012

hydrogenation 2011

vegetable oil refinery by-product,
organohalogen residue determination
2013

Okra

canned

effect of maturity 1884

effect of processing 1884

'Crimson Red', dehydrated, quality 1883
dehydrated, quality, influence of
variety 1883

'L-Sel-1', dehydrated, quality 1883

'PS(SLC-7 Dairy)', dehydrated, quality
1883

'Pusa Sawani', dehydrated, quality 1883

'Sel-2', dehydrated, quality 1883

'Vashali Vadhu', dehydrated, quality
1883

Oligosaccharide, green gram, effect of irradiation 1850

Olive oil, fatty acid composition 2019

Orange juice, limonin determination, HPLC
1995

Oregano contamination 2029

Organohalogen residue, vegetable oil
refinery by-product, determination 2013

Organoleptic property

beef heart

chilled 1957

frozen 1957

beef liver

chilled 1957

frozen 1957

blackcurrant syrup 1998

frankfurter, effect of sodium chloride
1975

lamb, effect of yeast growth 1966

maize based fortified food 1840

mung bean, canned

effect of ascorbic acid 1852

effect of calcium 1852

effect of citric acid 1852

effect of EDTA 1852

peach, high vacuum flame sterilized 1902
processed

belly 1970

ham 1970

spaghetti 1921

- OTS cans, welded 1777
- Oyster, composition, *effect of*
processing 1991
- Packaging 1779
 - egg breakage 1981
 - lamb, vacuum packed, *effect on*
organoleptic property 1964
 - ham, vacuum packed,
effect on
composition 1969
 - microorganism 1969
 - organoleptic property 1969
 - palatability 1969
 - yield 1969
 - savoury food 1922
- Pallatability
 - beef 1959
 - ham
effect of
potassium sorbate 1969
 - vacuum packaging 1969
- Palm oil,
 - olein deterioration
effect of BHA 2020
 - effect of* BHT 2020
- Parsley
 - dried
chlorophyllian-pigment compo-
sition 1878
 - colour determination 1878
- Pasteurized
 - milk quality determination,
limulus amebocyte assay 1924
- Pea, fatty acid metabolism 1841
- Peach, 'clingstone', high vacuum
flame sterilized, organoleptic
property 1902
- Peach juice
 - freezing point depression 1788
 - water activity 1788
- Peach seed
 - cyanide composition 1886
 - cyanogenic glycoside composition
1886
- Pear juice clarification *by* hallow
fiber ultrafiltration 1997
- Pecan
 - kernel colour
effect of cultivar 1864
 - effect of* processing 1864
 - effect of* storage 1864
- Pectin application *in* agro-food
industry 1789
- Pediococci, milk, salt-tolerant 1930
- Penicillic acid, cereal and cereal product
1813
- Penicillium, cereal contamination 1814
- Pentyl hydrodisulphide See flavour com-
pound
- Peroxidase
 - avocado 1903
 - brussels sprout 1877
 - cabbage 1877
- Pesticide residue
 - determination, GC 2033
 - food, cleanup 2034
 - infant food 1994
 - plant 2035
 - polyurethane air filter 2035
 - poultry meat 1978
 - soil 2035
 - water 2035
- Phaseolus vulgaris* See french bean
- Phenethylamine, soy sauce, determina-
tion, TLC 1858
- Phenol
 - blood, determination 1 87
 - fat, determination 1 87
 - tissue, determination 1787
- Phosphatase, meat adulteration, deter-
mination 1950
- Phosphine, wheat, determination, spectro-
photometry 1828
- Phosphorus
 - cheese, determination 1792
 - fruit juice, determination 1792
 - maize starch, determination 1792
- Phosvitin, egg yolk 1982
- Phul wadian See savoury food
- Phycomycetes, cereal contamination 1814
- Physiological effects, dietary fibre 2039
- Phytic acid
 - bread, Middle Eastern, *effect of* sodium
bicarbonate 1919
- Pisum sativum* See pea
- Plastein
 - horse bean protein 1851
- Polychlorinated biphenyl residue
 - blood serum
clean up 1993
 - extraction 1993
 - infant food
clean up 1993
 - extraction 1993
 - milk
clean up 1993
 - extraction 1993
- Polyethylene pouch, salt treated mango
slice 1901

Polyphenol, tea, effect of catechin 2002

Polyphenol oxidase

apple 'Red Delicious' 1904

avocado 1903

grape

Polysaccharide as thickening agent 1807

Pork

nutrient composition 1968

roast

effect of cooking time 1967

effect of microwave cooking 1967

Potassium, chocolate 1915

Potassium sorbate

effect on ham

composition 1969

microorganism 1969

organoleptic property 1969

yield 1969

Potato

browning, dehydration 1869

'chipbelle', nitrogenous compound

effect of baking 1870

effect of frying 1870

dehydration, browning 1869

'Katadhdin', nitrogenous compound

effect of baking 1870

effect of frying 1870

processing 1868

'Rosa', nitrogenous compound

effect of baking 1870

effect of frying 1870

starch 1871

whipped, *Bacillus cereus* 1872

Potato chip, lipid oxidation 1873

Poultry meat

chemical residues 1978

mechanically deboned 1979

Prawn, cooked, virus 1990

Preserve

amla, β -carotene retention 1867

carrot, β -carotene retention 1867

Preserved food, Alaskan,

composition 1786

microbiology 1786

Processing

effect on canned okra 1884

effect on frozen sliced strawberry quality 1889

effect on oyster composition 1991

effect on pecan kernel colour 1864

potato 1868

Propanol residue, soft drink, determination, GC 2000

Propylene residue, soft drink, determination, GC 2000

Protein

effect of alkali treatment 2037

cowpea flour nutritional value

effect of moisture 1847

effect of temperature 1847

fababean

foam property 1848

effect on hypercholesterolemia 1849

fish paste, gelation 1985

horse bean, plastein gel formation 1851

mustard, denaturation

guanidinium hydrochloride 1856

urea 1856

effect of sodium dodecyl sulphate 1855

rapeseed

denaturation by guanidinium

hydrochloride 1856

by urea 1850

effect of sodium dodecyl sulphate 1855

nutritional value improvement by

hydrolysis 1857

ultrafiltration 1857

sunflower seed 1859

Proteinase, cheese ripening 1945

Protein efficiency ratio

determination 2036

Protein food

soyabean/sorghum/wheat flour based 1832

Proteolysis

milk, denaturation, spectrophotometry 1926

milk protein, determination, spectrophotometry 1926

Puffed rice product quality 1819

Pumpkin seed

cellulose composition 1853

hemicellulose composition 1853

lignin composition 1853

Quality

blueberry

effect of carbon dioxide 1887

effect of nitrogen 1887

grape

effect of carbon dioxide 1887

effect of nitrogen 1887

Quercus ilex See acorn

Ragi husk fortification into diet 1830

Rancidity, butter, hydrolytic off-flavour 1937

- Rapeseed
 protein denaturation *effect of*
 guanidinium hydrochloride 1856
 urea 1856
 protein, *effect of* sodium dodecyl
 sulphate 1855
 protein, nutritional improvement
 by hydrolysis 1857
 by ultrafiltration 1857
- Refrigeration
 bovine carcass
 effect of conformation 1952
 effect of fattening 1952
 effect of weight 1952
- Rheology
 chufa beverage 1875
 solid food 2031
- Riboflavin See vitamin B
- Rice
 expanded
 processing condition 1818
 varietal difference 1817
 puffed, quality 1819
- Ripening, cheese *by* proteinase 1945
- Romano-type cheese, salting 1942
- Rye bread, flavour compound, deter-
 mination, column and HPLC 1918
- Salad oil, anilide determination 2014
- Sal, fat use in confectionery 2027
- Salmonella
 beef, *effect of* soy protein 1961
 recovery 2045
- Salting, Romano-type cheese 1942
- Sausage colour 1974
- Savoury food
 manufacture 1922
 packaging 1922
 storage 1922
- Scomber scombrus* See mackerel
- Selenium 2040
- Semolina 1920
- Sensors 1784
- Sesium sebiferum* See Chinese tallow
 fruit
- Sesquiterpene, Kumquat, composition
 1899
- Shellfish, microbiological evalua-
 tion 1989
- Sherry
 sugar alcohol 2006
 trehalose 2006
- Shorea robusta* See sal fat
- Silicon 2040
- Silo 2032
- Sisymbrium irio* oil, determination,
 chromatography 2015
- Skim milk, water activity 1788
- Skipjack tuna, histamine formation,
 effect of storage temperature 1986
- Sodium, chocolate 1915
- Sodium bicarbonate, *effect on* bread
 characteristics 1919
- Sodium chloride
 effect on frankfurter
 organoleptic property 1975
 stability 1974
- Sodium dodecyl sulphate
 effect on mustard protein 1855
 effect on rapeseed protein 1855
- Sodium hydroxide flour gelatiniza-
 tion 1911
- Soft drink
 propylene residue determination, GC
 2000
- Solar drying, french bean 1842
- Sorghum
 dough texture 1833
 flour nutritional value
 effect of milling 1831
- Sorghum/soyabean/wheat flour based protein
 food 1832
- Sourness, clingstone peach, high vacuum
 flame sterilized 1902
- Soyabean oil refining 2024
- Soyabean/sorghum/wheat flour based protein
 food 1832
- Soy protein
 effect on beef *Salmonella* heat resis-
 tance 1961
- Soy sauce, amine determination, TLC 1858
- Spaghetti convection heated, organoleptic
 property 1921
 microwave heated, organoleptic property
 1921
- Staphylococcal enterotoxin
 bacon 1972
 food, detection, ELISA test 2047
- Staphylococcus aureus*
 bacon 1972
 cheese 1944
 Egyptian Domiati 1943
 enterotoxin production
 bacon 1972
 cheese 1944
 effect of pH 2046
 effect of temperature 2046
 effect of water activity 2046

Staphylococcus aureus (contd.)

- growth
 - cheese 1944
 - effect of pH 2046
 - effect of temperature 2046
 - effect of water activity 2046
- Starch, bread, moisture composition 1916
- Sterilization
 - UHT, *Bacillus stearothermophilus* amylase 1796
- Sterilized
 - clingstone peach, organoleptic property 1902
- Sterol, determination, GC 2022
- Stomolophus nomural* See jellyfish
- Storage
 - egg breakage 1981
 - grape muscadine property 1893
 - lamb, lipid oxidation 1965
 - mackerel, histamine formation, effect of temperature 1986
 - effect on pecan kernel colour 1864
 - silos 2032
 - skipjack tuna, histamine formation, effect of temperature 1986
 - swordfish in CO₂ atmosphere 1987
- Strawberry
 - frozen sliced, quality
 - effect of processing 1889
 - effect of storage 1889
- Sugar confectionery
 - consumption 1914
 - industry 1913
- Sunflower seed
 - cellulose composition 1853
 - hemicellulose composition 1853
 - Japanese, lipid 1860
 - lignin composition 1853
 - protein 1859
- Sweetening agent
 - effect on ice recrystallization 1809
- Sweetness, clingstone peach, high vacuum flame sterilized 1902
- Sweet potato, dehydrated
 - ascorbic acid degradation 1874
 - β -carotene degradation 1874
- Swordfish, storage in CO₂ atmosphere 1987
- Tea
 - composition 2001
 - polyphenol formation, effect of catechin 2002

Temperature

- effect on cow pea flour
 - protein nutritional quality 1847
 - trypsin inhibitor activity 1847
- effect on *Staphylococcus aureus* enterotoxin production 2046
- growth 2046
- Terpene, Kumquat, composition 1899
- Texture
 - canned mung bean
 - effect of ascorbic acid 1852
 - effect of calcium 1852
 - effect of citric acid 1852
 - effect of EDTA 1852
 - sorghum dough 1833
- Thermal conductivity, frozen beef liver 1955
- Thiamin See vitamin B
- Thickening agent, polysaccharide 1807
- Tin 2040
- Tissue, chemical residue, determination 1787
- Tocopherol, determination, GC 2022
- Tomato, canning, USDA raw pack process 1880
- Tomato juice
 - freezing point depression 1788
 - water activity 1788
- Tomato protein concentrate
 - composition and yield
 - effect of coagulant 1881-2
 - effect of coagulation temperature 1881-2
- Tomato seed protein concentrate
 - composition and yield effect of chitin 1882
- Torsional vibration, viscosity drum content evaluation 1783
- Toxin
 - staphylococcal
 - in bacon 1972
 - in cheese 1944
 - in food, detection, ELISA test 2047
- Trace elements 2040
- Traditional cheddar cheese, nutritional quality 1941
- Transportation, egg breakage 1981
- Trehalose, sherry 2006
- Triacanthanol synthesis 2023
- Trypsin inhibitor
 - cowpea flour
 - effect of moisture 1847
 - effect of temperature 1847

- Tryptamine
soy sauce, determination, TLC 1858
- Turkey
muscle
binding capacity effect of
phosphate 1958
cohesiveness
effect of phosphate 1958
- Tyramine soy sauce, determination,
TLC 1858
- Ultrafiltration
casein isolation 1927
pear juice clarification 1997
rapeseed protein nutritional value
improvement 1857
- Urea
mustard protein denaturation 1856
rapeseed protein denaturation 1856
- Vaccinium angustifolium* See blueberry
- Vanadium 2040
- Vanaspati, animal fat adulterated,
detection 2028
- Vegetable oil 2010
byproduct, organohalogen residue
determination 2013
fatty acid determination, GLC 2012
hydrogenation 2011
- Vegetable
hydration 1842
fermentation by lactic acid, dialy-
sis pure-culture process 1865
Nigerian, ascorbic acid composi-
tion 1885
- Virus, cooked prawn 1990.
- Viscosity, drum content evaluation
by Torisional vibration 1783
- Vitamin A
blueberry, composition 1888
fortified milk, determination,
LC 1929
fortified milk powder, determina-
tion, spectrophotometry 1928
- Vitamin B
niacin, blueberry, composition
1888
- Vitamin C
amla preserve, retention 1867
blueberry, composition 1888
carrot preserve, retention 1867
- Vitamin D
fortified milk, determination, LC
1929
fortified milk powder, determina-
tion, spectrophotometry 1928
- Water activity
effect on *staphylococcus aureus*
growth 2046
enterotoxin production 2046
- Weaning food for Egyptian child 1992
- Weight
effect on bovine carcass refrigeration
1952
loss
beef heart
chilled 1957
frozen 1957
beef liver
chilled 1957
frozen 1957
- Wheat
deoxynivalenol determination, TLC 1825-7
lipid composition 1820
ochratoxin A determination, enzyme
linked immunosorbent assay 1824
phosphine residue determination, spectro-
photometry 1828
- Wheat-bran composite flour 1821
- Wheat dough 1822
- Wheat germ, naphthalene determination,
capillary GC 1823
- Wheat/sorghum/soyabean flour based protein
food 1832
- Whipped, potato, *Bacillus cereus* 1872
- Wine
American, composition 2003
Canadian, composition 2003
ethanol determination 2004
European, composition 2003
flavour 2005
naphthalene acetic acid residue 1897
quality, effect of cultivation practice
1890
'Vidal blanc'
composition effect of grape maturity
1896
quality effect of grape maturity 1896
- Yeast
Baker's, quality 1801
effect on lamb organoleptic property
1966
- Yoghurt
growth stimulation 1935
- Zearalenone, Hungarian chilli 2030
- Zinc 2040

I N D E X

- Acetoin, *Lactobacillus* 2079-80
- Acidophilus milk See fermented milk
- Acidulent 2085
- Additives as raw material in recombined dairy products 2188
- Aflatoxin
 - effect of chloroform-methanol 2393
 - groundnut-butter
 - determination 2131
 - liquid chromatography 2133
 - groundnut meal
 - effect of ammonium hydroxide 2132
 - effect of extrusion cooking 2132
 - maize 2114
- Aflatoxin B, effect of sodium bisulphite 2394
- Aflatoxin B₁
 - egg 2263
 - Egyptian bread 2177
- Aflatoxin M₁
 - dairy products contamination 2189
 - effect of pasteurization 2198
 - egg 2263
- Agaricus bisporus* See mushroom
- Agaritime, mushroom 2083
- Agricultural production 2051
- Agricultural waste, energy source 2059
- Alfalfa
 - effect on cholesterol metabolism 2376
 - composition and germination environment 2147
- Algal protein product, property 2076
- Alkaloid, glycoalkaloid, potato 2142
- Allergy, cereal product 2094
- Almond, mineral composition 2127
- Amaranth See colorant
- Amine, fish, determination 2271
- Amino acid
 - barley, determination, NIR spectroscopy 2103
 - wheat, determination, NIR spectroscopy 2103
- Ammonium hydroxide, effect on groundnut meal aflatoxin 2132
- Ammonium phosphate, grape juice
 - effect on yeast growth 2285
- Amylose, starch degradation, detection 2168
- Anaerobic metabolism, grape 2155
- Antibiotics effect on khoa coliforms 2212
- Antimicrobial activity
 - Lactobacillus acidophilus* in milk 2200
 - Staphylococcus aureus* in milk 2200
- Antimicrobial compounds
 - dicarbonyl 2086
 - from *Streptococcus lactis* 2081
- Apple, 'Golden Delicious', texture 2164
- Apricot jam, composition and rheology 2163
- Arsenic
 - chocolate 2295
 - cocoa and cocoa products 2295
- Ascorbic acid
 - fruits, determination, titrimetry 2151
 - loss during air drying of food 2053
 - orange juice, determination, HPLC 2286
 - potato, determination, HPLC 2141
 - powdered orange drink, determination, HPLC 2286
- Aseptic processing 2052
- Aspergillus* growth on wine cork 2301
- Azomethine H automated method, groundnut, boron determination 2130
- Bacillus cereus*, inhibitory effect of CO₂ 2078
- Bacon
 - cured, nitrosopyrrolidine determination 2248
 - microbial quality 2245
- Bacteria
 - CO₂ inhibitory effect 2078
- Bacterial enumeration, spray drier plant, microbiological method 2185
- Baker's yeast 2170
- Bakery 2170
 - additives 2170
 - ingredients
 - linseed 2170
 - pumpkin seed 2170
- Bakery products
 - alkaline 2170
 - organoleptic property 2170
 - production 2170
- Baking
 - bread roll 2170
 - effect on roll crispness 2172
 - wheat flour based bread, effect on vitamin 2180

Barley

amino acid determination, NIR
spectroscopy 2103

malting 2310

quality 2311, 2314

protein 2314

varietal identification 2309

Barley flour bread, effect of sodium
chloride 2179

Bay leaf, microscopic characteristic
2346

Bean

canned

quality 2115

texture 2115

dry, carbohydrates 2116

hemagglutinin 2117

Beef 2236

chilled, fat firmness 2226

colour, effect of electrical
stimulation 2216

defatted, protein 2228

high temperature conditioning

effect on carcass 2224

effect on keeping quality 2224

effect on organoleptic property
2224

keeping quality and lactic acid
2230

keeping quality effect of high
temperature conditioning 2224

mineral composition 2227

muscle

effect of electrical stimulation
2234

mineral composition 2227

myoglobin effect of electrical
stimulation 2216

organoleptic property effect of
high temperature conditioning 2224

packaging, vacuum packaging 2229
quality 2225

steak, restructure 2231

stored

effect on colour 2229

effect on microorganism 2229

effect on pH 2229

Beer

chill proofing 2302

proteolytic activity 2302

Bengal gram, raw and roasted, physio-
logical effect 2121

Bentonite, thermal property 2060

Beverages

carboxylic acid

determination, chromatography 2282

nitrosodimethylamine formation 2315

BHC See organochlorine pesticide residue

Bibliography

fish microscopy, 2213

meat microscopy 2213

Biomass

agricultural waste as energy source 2059

energy source 2058-9

Biscuit 2170

Black eyed bean, lectin composition 2117

Blanching

pea, ascorbic acid loss 2124

potato 2140

vegetable 2140

Bleaching, jelly-fish effect on sulphur
residue 2279

Boron, groundnut, determination, azomethine
H automated method 2130

Bos bubalis See buffalo

Bos indicus See zebu cattle

Botulism 2388

Bovine blood globin, emulsifying property
2232

Bread 2170, 2171

barley based, effect of sodium chloride
2179

calcium propionate determination, GC
2174

dietetic 2170

Egyptian

aflatoxin B₁ 2177

deoxynivalenol 2176

ginger bread

production 2183

quality 2183

lupine flour supplemented,

composition 2182

nutritional quality 2182

production by continuous extrusion
cooking 2173

propionic acid determination, GC 2174

protein-enriched 2170

quality and fermentation 2175

roll, effect of baking 2170

rye based

structure 2171, 2181

effect of sodium chloride 2179

sodium propionate determination, GC
2174

Bread (contd.)

- wheat based
 - effect of sodium chloride 2179
 - vitamin loss during baking 2180
- wheat/tuber based
 - formulation 2178
 - processing 2178

Brewer's yeast See yeast

Brewing 2308

Broad bean, composition and texture 2120

Broiler

- carcass, *Campylobacter jejuni* detection 2259
- meat quality 2258

Broiler farm 2257

Buffalo

- carcass fat characteristics 2235
- meat 2236

Cadmium, canned soup contamination 2379

Cajanus cajan See pigeon pea

Cake

- calcium propionate determination, GC 2174
- propionic acid determination, GC 2174
- sodium propionate determination, GC 2174

Calcium

- almond, composition 2127
- broad bean 2120

Calcium propionate

- bread, determination, GC 2174
- cake, determination, GC 2174

Campylobacter jejuni

- broiler carcass 2259
- chicken processing 2253
- turkey meat 2261

Canned dry bean quality 2115

Canned soup, metallic contamination 2379

Carbohydrate

- dry bean 2116
- property 2166
- structure 2166
- tea cream solubilization 2289

Carcass

- beef, effect of high temperature conditioning 2224
- broiler, *Campylobacter jejuni* detection 2259
- buffalo fat characteristics
- zebu cattle fat characteristics 2235

Carboxylic acid

- beverages, determination, chromatography 2282
- fruit juices, determination, ion exclusion chromatography 2284
- grape juice, determination ion exclusion chromatography 2284
- wine, determination, ion exclusion chromatography 2284

Cardamom oil 2351

Carmosine See colorant

Carotenoid, Australian tomato sauce 2148

Casein, effect on buffalo milk

- heat stability 2190
- salt level 2190

Cassava, effect on cholesterol metabolism 2376

Cassava chip, cyanide composition, effect of drying 2144

Cassava flour

- quality
 - effect of chemical treatment 2145
 - effect of fermentation 2145

Cassava leaf

- consumption 2143
- nutritional quality 2143
- processing 2143
- toxicity 2143

Cassava/potato/wheat flour blend, property 2108

Cassava product

- rice/tapioca flour product organoleptic property
 - effect of chemical treatment 2145

Cassava/wheat/potato flour based bread formulation 2178

processing 2178

Casteration, effect on goat meat quality 2239

Cattle, recovery from mixing stress 2233

Cereal flour, enzymatic hydrolysis 2092

Cereal product

- allergy 2094
- milled 2170

Cereals

- lipid composition 2343
- US quality standard 2090

Chapati, wheat evaluation 2100

Cheese

- aflatoxin M₁
- colby's, *Versinia enterocolitica* 2209
- Domiat
 - composition 2207
 - microbial quality 2207
 - organoleptic property 2207

- Cheese (contd.)
 - karish 2075
 - manchego, microbial quality 2208
 - mish 2075
 - Spanish, mineral composition 2211
 - Tafi, microbial quality
 - during manufacture 2209
 - during ripening 2209
- Chicken
 - clopidol determination, LC 2256
 - nitrogen composition 2255
 - processing, *Campylobacter jejuni* 2253
 - Staphylococcus* control
 - effect of CO₂ packaging 2252
 - effect of potassium sorbate 2252
- Chloroform-methanol, effect on aflatoxin 2393
- Chocolate, arsenic contamination 2295
- Cholesterol
 - metabolism
 - effect of alfalfa 2376
 - effect of cassava 2376
 - effect of yam 2376
 - effect of mung bean 2119
- Chufa composition 2146
- Cider quality 2318
- Citric acid, potato, determination, HPLC 2141
- Citrinin, hematological changes in mice 2395
- Citrus peel, chilling injury 2158
- Cladosporium* growth on wine cork 2301
- Clam
 - bacteria 2280
 - pesticide residue 2383
 - virus 2280
- Clopidol, chicken, determination, LC 2256
- Clostridium botulinum*
 - growth in pasteurized cured pork slurry 2244
 - toxin production
 - effect of CO₂ 2389
- Clostridium perfringens*
 - pork products 2245
 - spices and herbs 2347
- Clove leaf, microscopic characteristic, 2346
- Cocoa
 - arsenic contamination 2295
 - marketing 2293
 - production 2293
- Cocoa bean
 - fermentation 2293
 - fermented
 - dry 2293
 - storage 2293
 - processing 2293
- Cocoa industry, Indian 2293
- Cocoa products
 - arsenic contamination 2295
- Coconut
 - dessicated
 - marketing 2128
 - production 2128
 - marketing 2128
 - production 2128
 - protein 2128
- Coconut oil 2321
 - marketing 2128
 - production 2128
- Coconut products
 - marketing 2128
 - production 2128
- Cod
 - composition 2269
 - nutritional property 2269
- Coffee
 - decaffeinated 2292
 - metal analysis 2067
- Coliforms in pork products 2245
- Colorant
 - determination, spectrophotometry 2087
 - D & C Red No. 6 and 7 toluidine
 - determination, LC 2089
 - FD & C Red Dye #3 toxicity 2381
 - FD & C Yellow No. 6 determination, LC 2088
 - recombined dairy products 2188
- Colour
 - beef
 - aerobically stored 2229
 - effect of electrical stimulation 2216
 - instrumental measurement 2352
 - pear juice concentrate
 - effect of storage temperature 2287
- Composite flour, property 2108
- Conjugase treatment, folacin microbiological assay 2072
- Cooking quality, Cow pea 2122
- Cottonseed oil 2321
 - fatty acid methyl ester solubility in methanol 2325
- Cow pea, cooking quality 2122

- Cream
 aflatoxin M₁ contaminated
 effect of pasteurization 2198
 phosphatase reactivation 2193
- Crispness, rolls, effect of baking 2172
- Crumpet, gas packaged, microbiology 2184
- Ctenochaetes strigosus* See reef fish
- Cultured milk, effect on mice growth 2197
- Curcuma longa* See turmeric
- Cured
 bacon, nitrosopyrrolidine determination 2248
 ham
 ripening 2247
 salinity 2247
 pork slurry, *Clostridium botulinum* growth 2244
- Curing, turmeric 2350
- Cyanide, cassava chip, effect of drying 2144
- Cyperus esculentus* See chufa
- Dairy products
 aflatoxin M₁ contamination 2189
 Lactobacillus enzymic activity 2187
 recombined 2188
 Staphylococcus aureus identification, thermostable nuclease test 2186
- DDE See organochlorine pesticide
- DDT See organochlorine pesticide
- Deaminopimelate decarboxylase See enzymes
- Dehulling pigeon pea 2125
- Dehydrated food
 Klebsiella isolation 2387
 oxidation 2054
- Dehydroascorbic acid See ascorbic acid
- Deoxynivalenol, Egyptian bread 2176
- Dessicated coconut
 marketing 2128
 production 2128
- Developmental psychotoxicity
 FD & C Red Dye #3 2381
- Diacetyl, *Lactobacillus* 2079-80
- Dicarbonyl
 antimicrobial property 2086
- Dieldrin See organochlorine pesticide
- Dietetic bread 2170
- Diglyceride, stabilizer 2345
- Direct microscopic somatic cell count, milk 2071
- Drying
 air, ascorbic acid loss in food 2053
 effect on cassava chip
 cyanide composition 2144
 tea 2288
- Dry milk, nitrosodimethylamine determination 2195
- Dye See colorant
- Edible oil
 organochlorine pesticide residue 2324
 polynuclear hydrocarbon determination 2323
- Egg
 aflatoxin B₁ and M₁ 2263
 albumin
 plastein property 2264
 rheology 2265
 lipid composition 2343
 liquid egg, rheology 2266
 marketing 2262
- Electrical stimulation
 effect on beef
 colour 2216
 muscle 2234
 myoglobin 2216
 effect on steer carcass 2241
- Elettaria cardamomum* See cardamom
- Emulsifier
 analysis, GC 2344
 recombined dairy products 2188
- Emulsifying property, bovine blood globin 2232
- Endrin See organochlorine pesticide residue
- Energy, biomass as source 2058-9
- Enzymes
 deaminopimelate carboxylase, potato property 2139
 purification 2139
 human milk
 effect of freeze drying 2191
 effect of heating 2191
 effect of pasteurization 2191
 effect of storage 2191
 keto acid decarboxylase activity, *Lactobacillus* in dairy products 2186
 lipase inactivation in human milk by heat 2194
 NADH-oxidase activity, *Lactobacillus* in dairy products 2186
 threonine aldolase activity, *Lactobacillus* in dairy products 2186

Enzymes (contd.)

- urease activity, *Lactobacillus* in dairy products 2186
- effect of vitamin A 2371
- Erythrosine See colorant
- Escherichia coli*, pork products 2245
- Ethephon, effect on orange ripening 2159
- Extrusion, maize starch 2113
- Extrusion cooking
 - flat bread production 2173
 - groundnut meal, aflatoxin decomposition 2132

Fast foods 2170

Fast Red E See colorant

Fats

- beef, firmness 2226
- blended, preparation by interestrification 2335
- buffalo carcass characteristics 2235
- food, determination 2339
- frying, analysis 2340
- labelling regulation 2336
- organochlorine pesticide residue 2341
- oxidation product odour 2337-8
- water determination 2322
- zebu cattle carcass characteristics 2236

Fatty acid

- brown rice variety 2098
- cottonseed oil solubility in methanol 2325
- safflower oil 2333
- winged bean seed oil 2333

Fermentation

- bread manufacture 2175
- enhancement
 - effect of manganese 2074
 - by spices 2074

Fermented dairy products 2078

Fermented milk See cultured milk

Fibre

- spun protein fibre 2367
- dope preparation 2366
- water binding capacity 2365

Film, photosensitive oxygen

- scavenger film for packaging 2056

Fish

- amine determination 2271
- hypoxanthine determination, enzyme sensor 2272

Fish (contd.)

- lipid composition 2343
- metal contamination 2270
- microscopy, bibliography 2213
- nucleotide determination, enzyme sensor 2272-3
- pesticide residue 2383
- preservation 2268
- processing 2268

Fish sauce, glutamic acid determination, enzymatic 2274

Flat bread production by continuous extrusion cooking 2173

Flavour

- CTC black tea 2291
- lamb, frozen stored 2240
- mutton, effect of sugar 2237
- roasted groundnut 2129
- wine 2299

Flavourings, recombined dairy products 2188

Folacin assay, conjugase treatment 2072

Food

- ascorbic acid loss during air drying 2053
- dehydrated, oxidation 2054
- fat determination 2339
- Klebsiella* isolation 2386
- lipid composition 2343
- liquid food
 - texture 2354
 - viscosity 2355
- moisture determination 2339
- pesticide residue 2382
- semisolid food, texture 2354
- Staphylococcus aureus* enterotoxin determination, radio-immunology 2391
- virus 2397

Food and Drug Regulation 2068

Food control service

- Switzerland 2070

Food product

- analysis, model and method 2064

Food regulation 2068-9

Food safety 2377

Freeze drying

- human milk
 - effect on enzymes 2191
 - effect on lipid 2191
 - effect on vitamin 2191

French bean, trypsin inhibitory activity 2118

Frozen stored lamb flavour 2240

Fructose, sweetness 2166

- Fruit juice 2283
 - carboxylic acid determination, ion-exclusion chromatography 2284
- Fruits, ascorbic acid determination, titrimetry 2151
- Fumaric acid, potato, determination, HPLC 2141
- Gadus morhua* See cod
- Garlic, 'Red Variety' storage
 - effect of γ -irradiation 2349
- Gelatin, coliforms 2077
- Germination, effect on alfalfa composition 2147
- Ginger bread
 - flour quality 2179
 - production 2170, 2183
 - quality 2183
- Gliadin, durum wheat, determination, HPLC 2106
- Glucan
 - barley malting quality 2311
 - degradation
 - during malting 2313
 - during mashing 2313
- Glucanase
 - degradation
 - during malting 2313
 - during mashing 2313
- Glucose, sweetness 2166
- Glutamic acid
 - fish noodle, determination, enzymatic 2274
 - fish sauce, determination 2274
- Gluten
 - wheat, alkaline treatment 2104
 - wheat, determination, HPLC 2105
- Glycoalkaloid See alkaloid
- Goat meat quality effect of castration 2239
- Grape
 - anaerobic metabolism 2155
 - varieties, characteristics 2157
 - volatile compound 2156
- Grape juice
 - carboxylic acid determination, ion-exclusion chromatography 2284
 - malic acid determination, ion-exclusion chromatography 2284
 - preserved, yeast growth
 - effect of ammonium phosphate 2285
 - effect of vitamin 2285
- Grape juice (contd.)
 - tartaric acid determination, ion-exclusion chromatography 2284
- Grape must, wine 2296
- Groundnut 2135
 - boron determination, azomethine H automated method 2130
 - roasted, flavour evaluation 2129
- Groundnut butter
 - aflatoxin determination 2131
 - liquid chromatography 2133
- Groundnut meal
 - aflatoxin
 - effect of ammonium hydroxide 2132
 - effect of extrusion cooking 2132
- Groundnut oil 2321
- Guava
 - processing 2150
 - production 2150
 - quality 2150
- Guava-mango nectar blend quality 2165
- Ham
 - country-style
 - organoleptic property
 - effect of potassium chloride 2246
 - weight-loss
 - effect of potassium chloride 2246
 - cured
 - ripening 2247
 - salinity 2247
 - microbial quality 2245
- Hardness See firmness
- HCB See organochlorine pesticide residue
- HCH-isomer See organochlorine pesticide residue
- Health and nutrition 2372
- Heat, milk lipase inactivation 2194
- Heating
 - human milk
 - effect on enzymes 2191
 - effect on lipid 2191
 - effect on vitamin 2191
- Heat stability
 - buffalo milk
 - effect of concentration 2190
 - effect of casein 2190
- Heptachlorepoxy See organochlorine pesticide residue
- Herbs, *Clostridium perfringens* 2347
- Herrings, nitrosamine 2276
- Hexane loss, rapeseed oil extraction 2332
- Hexachlorobenzene See organochlorine pesticide residue

Hibiscus esculentus See okra
High temperature conditioning

effect on beef
carcass 2224
keeping quality 2224
organoleptic property 2224

Hop

acid degradation, enzymatic 2306
production 2305

Hop oil stability 2307

Hopping, dry 2307

Horse gram protein nutritional quality
2123

Human milk

enzymes

effect of freeze drying 2191
effect of heating 2191
effect of pasteurization 2191
effect of storage 2191
lipase, inactivation by heat 2194
lipid

effect of freeze drying 2191
effect of heating 2191
effect of pasteurization 2191
effect of storage 2191

vitamin

effect of freeze drying 2191
effect of heating 2191
effect of pasteurization 2191
effect of storage 2191

Hydrogenation, menhaden oil 2327-8

Hypoxanthine, fish, determination,
enzyme sensor 2272

Industrial raw material, starch
2167

Inosine See nucleotide

Inosine-S-monophosphate See
nucleotide

Insect

resistance to phosphine 2362
susceptibility to piperonyl
butoxide 2360

Insect pest control, pheromone 2358

Insecticide effect on rats 2361

Irradiated

potato, enzyme
property 2139
purification 2139

Irradiation

food 2052
effect on garlic 2349
effect on strawberry volatile com-
pound composition 2154

Jellyfish, sulphur residue, effect of

Keeping quality

beef 2230
beef effect of high temperature
conditioning 2224
mandarin squash 2161
orange squash 2161
soyabean curd 2134

Keto acid decarboxylase See enzymes

Khoa, coliforms, effect of antibiotics
2212

Kidney bean, lectin composition 2117

Klebsiella

food, isolation 2386
water, isolation 2386

Lactic acid, beef and keeping quality
2230

Lactobacillus

acetoin production 2079-80
diacetyl production 2079-80
enzymic activity in dairy products
2187
meat products 2221
wine 2300

Lactobacillus acidophilus antimicrobial
activity in milk 2200

Lactose bile broth 2077

Lactose glutamic acid broth 2077

Lamb, frozen stored, flavour 2240

Lard 2321

Lead

canned soup, determination 2379
drinking water 2378

Lectin, legume 2117

Legume

lectin composition 2117
US quality standard 2090

Lemon

processing 2150
production 2150
quality 2150

Lentil, lectin composition 2117

Lindane See organochlorine pesticide
residue

Linseed as bakery ingredients 2170

Lipase See enzymes

Lipid

as baking aid 2342
food 2343
human milk
effect of freeze drying 2191
effect of heating 2191
effect of pasteurization 2191
effect of storage 2191

Lipid (contd.)

meat, extraction 2218

Longissimus muscle See muscle

Lophius piscatorius See monkfish

Lycopene See carotenoid

Mackerel 2277

Magnesium, almond composition 2127

Maillard reaction 2062

effect of heat 2062

effect of pH 2062

effect of water activity 2062

Maize

aflatoxin 2114

nutritional property 2112

starch

enzymatic hydrolysis 2092

extrusion 2113

Maize flour, enzymatic hydrolysis 2092

Maize oil 2321

Malic acid

grape juice, determination, ion

exclusion chromatography 2284

potato, determination, HPLC 2141

wine, determination, ion

exclusion chromatography 2284

Malt

homogeneity 2316

nitrosodimethylamine formation 2315

property 2314

Malting 2308

barley 2310, 2314

glucanase degradation 2313

starch hydrolysis 2312

Mandarin

distribution 2160

processing 2150

production 2150

quality 2150, 2160

squash

composition 2161

keeping quality 2161

organoleptic property 2161

Mango

'Alphanso'

ripening 2162

storage 2162

processing 2150

production 2150

quality 2150

Manihot esculenta See cassava

Marketing

coconut and coconut products 2128

egg 2262

Marketing (contd.)

poultry 2262

walnut 2135

Mashing

glucan degradation 2313

glucanase degradation 2313

starch hydrolysis 2312

Meat

colour 2217

effect of electrical stimulation 2216

cooked, thermal conductivity 2219

emulsion 2222

lactic acid fermentation 2074

lipid

composition 2343

extraction 2218

microscopy, bibliography 2213

packaging, gas atmospheric packaging
2215

paste 2222

Meat industry

Australian 2214

Meat products

Lactobacillus 2221

minced 2222

restructured 2220

Mechanically deboned poultry meat, quality
2250

Menhaden oil, hydrogenation 2327-8

Mercury, canned soup contamination 2379

Merluccius bilinearis See whiting

Metal

wheat contamination, effect of milling
2101

canned soup contamination 2379

clam contamination 2383

fish contamination 2383

Methanol, cottonseed oil fatty acid methyl
ester solubility 2325

Methoxychlor See organochlorine pesticide
residue

Microbial contamination, wheat 2102

Microbial pesticides 2359

Microbiological assay

folacin, conjugase

treatment 2072

Microbiological quality

beef, aerobically stored 2229

cheese

Domiaty 2207

Manchego 2208

tafi

during manufacture 2209

during ripening 2209

Microbiological quality (contd.)

- clam 2280
- khoa effect of antibiotics 2212
- mutton 2238
- pork products 2245
- Microorganisms effect of nutrition 2375
- Milk
 - aflatoxin M₁ contamination 2189
 - effect of pasteurization 2198
 - buffalo's
 - acid production
 - effect of dissolved oxygen 2203
 - effect of heat 2203
 - heat stability
 - effect of casein 2190
 - effect of concentration 2190
 - salt level
 - effect of casein 2190
 - effect of concentration 2190
 - Staphylococcus thermophilus* anti-microbial activity 2200
 - cow's,
 - Lactobacillus acidophilus* anti-microbial activity 2200
 - Streptococcus thermophilus* anti-microbial activity 2200
 - fermented, effect on mice growth 2197
 - goat's
 - Lactobacillus acidophilus* anti-microbial activity 2200
 - Staphylococcus thermophilus* anti-microbial property 2200
 - Klebsiella* isolation 2387
 - lipase inactivation by heat 2194
 - microbial evaluation, direct
 - microscopic somatic cell count procedure 2071
 - nitrosodimethylamine determination 2195
 - pasteurized
 - psychrophile enumeration 2199
 - Versinia enterocolitica* toxicity 2201
 - spoilage inhibition by micro-organisms 2200
 - Staphylococcus aureus* identification, thermostable nuclease test 2186
 - Streptococcus cremoris*
 - acid production 2202
 - growth 2202
 - Versinia enterocolitica* toxicity 2201

- Milk fat, as raw material in recombined dairy products 2188
- Milk powder 2188
- Milk protein, water binding capacity determination, NMR 2196
- Milling, effect on wheat metal contamination 2101
- Minerals
 - almond composition 2127
 - beef muscle composition 2227
 - cheese, Spanish 2211
- Mirex See organochlorine pesticide residue
- Moisture, food, determination 2339
- Monkfish
 - composition 2269
 - nutritional property 2269
- Monoglyceride, analysis, GC 2344
- Mould 2392
- Mucor* growth on wine cork
- Mungbean effect on cholesterol level 2119
- Muscle
 - beef
 - effect of electrical stimulation 2234
 - mineral composition 2227
- Mushroom
 - agaritine composition 2083
 - Finnish, selenium composition 2082
- Mustard seed oil 2329
- Mutton
 - Klebsiella* isolation 2387
 - organoleptic property effect of sugar 2237
 - stored and fresh, microbial quality 2238
- Mycotoxins 2392
- Mycotoxin 2392
- Myoglobin effect of electrical stimulation 2216
- NADH-oxidase See enzymes
- Nectar, guava-mango based, quality 2165
- Nemipterus japonicus*
 - size 2278
 - yield 2278
- Nitrite
 - determination, titrimetry and polarography 2065
 - effect on pork slurry *Clostridium botulinum* growth 2244
- Nitrogen, almond, composition 2127
- Nitrosamine, herring 2276
- Nitrosodimethylamine
 - malt 2315
 - milk 2195

- Nitrosopyrrolidine, cured bacon, determination 2248
- Noodle, fish, glutamic acid determination, enzymatic 2274
- Nucleotide, fish, determination, emymic sensor 2272-3
- Nutrition
 - education of industrial workers 2373
 - role of microorganisms 2375
 - rural diet 2374
- Nutritional quality of cassava leaf 2143
- Nutrition and health 2372
- Ochratoxin A
 - hematological changes in mice 2395
 - teratogenicity effect of dietary protein 2396
- Odour
 - mutton effect of sugar 2237
 - sensory scaling 2353
- Oils, water determination 2322
- Oilseed, lipid composition 2843
- Okra
 - canning 2149
 - chemistry 2149
 - composition 2149
 - dehydration 2149
 - export 2149
 - nutritional quality 2149
 - packaging 2149
 - preservation 2149
 - processing 2149
 - storage 2149
 - technology 2149
- Olive oil 2321
- Orange. ripening effect of ethephon 2159
- Orange juice
 - ascorbic acid determination, HPLC 2286
- Orange squash
 - composition 2161
 - keeping quality 2161
 - organoleptic quality 2161
- Organochlorine insecticide residue
 - in clam 2383
 - in fish 2383
- Organochloride pesticide residue
 - fat cleanup 2341
 - poultry, determination, GC 2254
- Organoleptic property
 - beef effect of high temperature conditioning 2224
- Organoleptic property (contd.)
 - cheese, Domiati 2207
 - mandarin squash 2161
 - roasted groundnut 2129
 - orange squash 2161
- Organophosphorus insecticide effect on rats 2361
- Osmosis, potato 2137-8
- Oxalic acid, potato, determination, HPLC 2141
- Oxidation, dehydrated food 2054
- Packaging
 - CO₂ gas packaging of chicken, effect on *Staphylococcus* 2252
 - gas packaging of meat 2215
 - poultry meat 2251-2
 - vacuum packaging
 - beef 2229
 - pork, psychrophile growth 2243
- Packaging material, photosensitive oxygen scavenger film 2056
- Paecilomyces growth on wine cork 2301
- Palm oil 2321
 - tochopherol 2330
- Pasteurized milk, psychrophile enumeration 2199
- Pasteurization
 - cream effect on aflatoxin M₁ 2198
 - human milk
 - effect on enzymes 2191
 - effect on lipid 2191
 - effect on vitamin 2191
 - milk effect on aflatoxin M₁ 2198
 - skim milk effect on aflatoxin M₁ 2198
- Pasting, cassava/potato/wheat flour blend 2108
- Pea
 - ascorbic acid loss during blanching 2124
 - lectin composition 2117
 - metal composition 2067
- Peach
 - processing 2150
 - production 2150
 - quality 2150
- Peanut See groundnut
- Pear juice concentrate, colour stability improvement, effect of storage temperature 2287
- Penicillium growth on wine cork 2301
- Pentachlorophenol determination, GC 2364
- Pentose See sugars
- Peptide in wheat 2099

- Pesticide
 - analysis, AOAC 2357
 - microbial 2359
- Pesticide residue *in* food 2382
- pH, aerobically stored beef 2229
- Phaseolus vulgaris* See French bean
- Pheromone *in* insect pest control 2358
- Phosphatase, cream 2193
- Phosphine, insect resistance 2362
- Phospholipid, food 2343
- Phosphorus
 - almond, composition 2127
 - broad bean 2120
- Physiological effect of raw and roasted Bengal gram
- Phytate, broad bean 2120
- Pie, production and quality 2170
- Pigeon pea dehulling 2125
- Piper*
 - cytology 2348
 - chemical composition 2348
 - morphology 2348
- Piperonyl butoxide, insect susceptibility 2360
- Plastein
 - biochemistry 2370
 - property 2264
- Polychlorinated pesticide residue
 - See organochlorine pesticide residue
- Polyphenol, tea, determination, colorimetry 2289
- Pomegranate seed oil 2331
- Ponceaur 4 R See colorant
- Pork
 - packed, vacuum, psychrophile growth 2243
 - sorbate treated, psychrophile growth 2243
- Pork product
 - microbial quality 2245
 - slurry, pasteurized and cured, *Clostridium botulinum* growth 2244
- Potassium, almond composition 2127
- Potassium chloride, effect on country style ham property 2246
- Potassium sorbate
 - effect on chicken *Staphylococcus* 2252
 - effect on pork psychrophile growth 2243
- Potato
 - alkaloids 2142
 - blanching 2140
- Potato (contd.)
 - irradiated
 - enzyme
 - property 2139
 - purification 2139
 - organic acid determination, HPLC 2141
 - osmotic concentration 2137-8
 - water activity 2137-8
- Potato/cassava/wheat flour based bread
 - formation 2178
 - processing 2178
- Pouch thermal processing 2055
- Poultry
 - development *in* India 2249
 - marketing 2262
 - meat, mechanically deboned, quality 2250
 - organochlorine pesticide residue determination, GC 2254
 - packaging 2251
- Powdered orange drink, ascorbic acid determination, HPLC 2286
- Preservation, fish 2268
- Preserved grape juice
 - yeast growth
 - effect of ammonium phosphate 2285
 - effect of vitamin 2285
- Processing
 - fish 2268
 - effect on human milk 2191
- Propionic acid
 - bread, determination, GC 2174
 - cake, determination, GC 2174
- Protease, communitied squid 2281
- Protein
 - alfalfa 2147
 - algal 2076
 - nutritional quality 2364
 - effect on ochratoxin A teratogenicity 2396
 - wheat flour, determination, 2109
- Protein efficiency ratio 2368
 - defatted beef 2228
- Protein enriched bread 2170
- Prunus amygdalus* See almond
- Psophocarpus tetragonolobus* See winged bean
- Psychrophile
 - enumeration *in* pasteurized milk 2199
 - growth
 - in* sorbate treated pork 2243
 - in* vacuum packed pork 2243
- Pumpkin seed as bakery ingredient 2170
- Pumpkin seed oil
 - effect of cultivation 2326
 - effect of genotype 2326

- Rapeseed oil, hexane loss *during* extraction 2332
- Raspberry
 sugar determination, HPLC 2152
 volatile compounds
 determination 2153
 extraction 2153
- Rat, *effect of* organophosphorus insecticide 2361
- Raw materials
 milk fat *in* recombined dairy products 2188
- Reef fish 2275
- Regulation
 food 2069
 food and drug 2068
- Rheology
 apricot jam 2163
 cassava/potato/wheat flour blend product 2108
- Rhizoctonia* growth on wine cork 2301
- Riboflavin, wheat flour based bread *effect of* baking 2180
- Rice, brown variety, fatty acid composition 2095
- Rice bran oil 2096-7
- Ripening
 'Alphonso' mango 2162
 cured ham 2247
 'Tafi' cheese, microbial quality 2209
- Rodenticide, edible fat as carrier 2363
- Rolls, crispness, *effect of* baking 2172
- Rural diet, nutrition 2374
- Rye bread
 effect of sodium chloride 2179
 structure 2170, 2181
- Safflower oil 2321
 fatty acid composition 2333
- Salt
 buffalo milk
 effect of casein 2190
 effect of concentration 2190
 cured ham 2247
 iodised salt, iodide determination, HPLC 2066
 as raw material *in* recombined dairy products 2188
- Sanitary regulation 2069
- Sauce, Australian tomato sauce composition 2148
- Scup
 composition 2269
 nutritional quality 2269
- Selenium, Finish mushroom 2082
- Semolina
 durum wheat
 colour 2107
 cooking quality 2107
 oxidation 2107
- Sensory profiling, facial representation 2356
- Sensory scaling, taste and odour 2353
- Shelf-life See keeping quality
- Shellfish, lipid composition 2343
- Skim milk
 aflatoxin M₁ contaminated, *effect of* pasteurization 2198
- Sodium, almond, composition 2127
- Sodium bisulphite, *effect on* aflatoxin B₁ 2394
- Sodium chloride *effect on* bread 2179
- Sodium propionate
 bread, determination, GC 2174
 cake, determination, GC 2174
- Sorghum
 dough
 quality 2111
 texture 2111
 water uptake 2111
 quality 2111
- Soups, canned, metallic contamination 2379
- Soyabean curd, keeping quality 2134
- Soyabean oil 2321
- Soy flour, metal composition 2067
- Spices
 Clostridium perfringens isolation 2347
 Klebsiella isolation 2387
- Spray drier plant, microbiological methods *for* bacterial enumeration 2185
- Spirulina platensis* See algae
- Squash
 mandarin
 composition 2161
 keeping quality 2161
 organoleptic quality 2161
 orange
 composition 2161
 keeping quality 2161
 organoleptic quality 2161
- Squid
 communitied, protease activity 2281
 composition 2269
 nutritional quality 2269

- Stabiliser
 diglycerides 2345
 recombined dairy products 2188
- Standard
 US cereal quality 2090
 US legume quality 2090
- Staphylococcal* enterotoxin synthesis 2390
- Staphylococcus*
 chicken
 effect of CO₂ packaging 2252
 effect of potassium sorbate 2252
- Staphylococcus aureus*
 dairy products, identification, thermo-stable nuclease test 2186
 enterotoxin, food, determination, radioimmunology 2391
- Staphylococcus thermophilus*, antimicrobial activity in milk 2200
- Starch
 calorimetry 2169
 degradation by β -amylase detection 2168
 hydrolysis
 in malting 2312
 in mashing 2312
 industrial raw material 2167
- Steer
 carcass effect of electrical stimulation 2241
 meat quality 2242
- Stenotomous chrysops* See scup
- Storage
 'Alphonso' mango 2162
 'Golden Delicious' apple, texture 2164
 citrus peel chilling injury due to refrigeration and storage 2158
 garlic, 'red variety' effect of γ -irradiation 2349
 human milk
 effect on enzymes 2191
 effect on lipid 2191
 effect on vitamin 2191
 pear juice concentrate colour, stability 2287
- Strawberry
 sugar determination, HPLC 2152
 volatile compounds, effect of irradiation 2154
- Streptococcus*
 pork product 2245
- Streptococcus cremoris*
 acid production in milk 2202
 growth in milk 2202
- Streptococcus lactis*, antimicrobial substance 2081
- Sucrose, sweetness 2166
- Sugars
 pentose effect on mutton organoleptic quality 2237
 raspberry, determination, HPLC 2152
 strawberry, determination, HPLC 2152
- Sulphur
 almond, composition 2127
 residues in jelly fish effect of bleaching 2279
- Sunflower oil 2321
 organochlorine pesticide residues 2324
- Sunset yellow FCF See colorant
- Sweetness, sugars 2166
- Tallow 2321
- Tartaric acid
 grape juice, determination, ion exclusion chromatography 2284
 wine, determination, ion exclusion chromatography 2284
- Tartrazine See colorant
- Taste, sensory scaling 2353
- TDE See organochlorine pesticide residue
- Tea
 cream solubilisation, effect of carbohydrates 2289
 CTC black tea, flavour 2291
 Darjeeling's, drying 2288
 drying 2288
 metal composition 2067
 polyphenol determination, colorimetry 2289
- 3,3,4,4'-tetrachlorobiphenyl
 distribution 2385
 toxicity to chicken embryo 2385
- Texture
 apple, 'Golden Delicious' 2164
 canned, dry bean 2115
 cassava/potato/wheat flour blend 2108
 cooked broad bean 2120
 liquid food 2354
 semi-solid food 2354
- Thermal conductivity of cooked meat 2219
- Thermal processing, pouch 2055
- Thermal property 2060
- Thermo-stable nuclease test
 dairy products, *Staphylococcus aureus* identification 2186

- Thiamin See vitamin B
- Threonine aldolase See enzymes
- Thyroid function effect of vegetables 2136
- Tin, canned soup contamination 2379
- Tocopherol
- palm oil
 - wheat germ oil, determination 2110
- Tomato sauce, Australian, composition 2148
- Toxaphene See organochlorine pesticide residue
- Toxicity
- cassava leaf 2143
 - developmental, FD and C Red Dye #3 2381
 - psychotoxicity, FD and C Red Dye 3# 2381
- Toxicity and food supply 2377
- Toxin, *Clostridium botulinum* effect of CO₂
- Trichoderma* growth on wine cork
- Trypsin, french bean 2118
- Turkey meat
- Campylobacter jejuni* 2261
 - composition 2260
- Turmeric, curing 2350
- Urease See enzymes
- Vanaspati like plastic fat 2335
- Vegetable oil, as raw material in recombined dairy products 2188
- Vegetables
- blanching 2140
 - Klebsiella* isolation 2387
 - effect on thyroid function 2136
- Vibrotone, vacuum measuring instrument 2057
- Vicia faba* See broad bean
- Virus
- in clam 2280
 - in food 2397
- Viscosity, liquid food 2355
- Vitamin
- as raw material in recombined dairy products 2188
 - wheat flour based bread effect of baking 2188
- Vitamin A effect on enzyme system 2371
- Vitamin B
- grape juice, effect on yeast growth 2285
- Vitis rotundifolia* See grape
- Volatile compound
- grape 2156
 - raspberry
 - determination 2153
 - extraction 2153
- Walnut
- composition 2135
 - marketing 2135
 - production 2135
 - quality control 2135
- Water
- lead contaminated 2378
 - Klebsiella* isolation 2386-7
 - quality 2063
- Water activity
- effect on Maillard reaction 2061
 - potato 2137-8
- Water binding capacity
- fibre, determination, 2365
 - milk protein, determination, NMR 2196
- Wheat
- amino acid determination, NIR spectroscopy 2103
 - composition 2100
 - durum
 - gliadin determination, HPLC 2106
 - quality 2106
 - semolina
 - colour 2107
 - cooking quality 2107
 - oxidation during mixing 2107
- gluten
- alkaline treatment 2104
 - determination, HPLC 2105
 - microbial contamination 2102
 - peptide composition 2099
 - quality 2099
 - toxic metals effect of milling 2101
 - volume and weight 2098
- Wheat/cassava/potato flour based bread
- formulation 2178
 - processing 2178
- Wheat flour 2170
- bread
 - effect of sodium chloride 2179
 - vitamin loss during baking 2180
- enzymatic hydrolysis 2092
- protein determination 2109
- Wheat germ oil determination 2110
- Wheat protein concentrate stability 2206

Whey
utilization 2205

Whisky
fermentation 2319
mashing 2319

Whiting
composition 2269
nutritional quality 2269

Wine
carboxylic acid determination,
ion exclusion chromatography 2284
cork, fungal growth 2301
flavour evaluation 2299
grape must blending 2296
Lactobacillus 2300
malic acid determination,
ion exclusion chromatography 2284
metal composition 2067
tartaric acid determination, ion
exclusion chromatography 2284
volatile constituent 2298

Wine yeast, alcohol degradation by
fermentation 2297

Winged bean polysaccharide 2126
Winged bean seed oil, fatty acid
composition

Wort
dimethyl sulphide inhibitor 2317

Yam *effect on cholesterol metabolism*
2376

Yeast
brewer's
determination 2304
genetic manipulation 2303
grape juice, preserved
effect of ammonium phosphate 2285
effect of vitamin 2285

Yersinia enterocolitica
colby cheese 2209
toxigenicity *in milk* 2201

Yoghurt, acid production 2204

Zebu cattle, carcass fat characteristics
2235

Zein, peptide 2093

Bacillus cereus

effect of cooling 2805

effect of heating 2805

survival 2806

Bacon

keeping quality

effect of potassium sorbate 2654

effect of sodium nitrite 2654

Bacteria, lactic acid, preservation
2448

Bacterial insecticide 2758

Bacteriological quality

meat 2636-8

pork 2644

shrimp, effect of processing 2684

Bakery additive, bread quality 2606

Bakery product quality, effect of
additive 2606

Bambara pea trypsin inhibitor 2521

Barley 2490

grinding and hydrothermal treatment
2713

moisture determination 2493

nitrogen determination 2493

protein, tryptophan composition
2492

Beef

bacteriological quality 2636

chilled, shipment 2639

lysosome 2640

Beer

amino acid composition 2710

carcinogenic hydrocarbon 2712

chromium determination, AAS 2711

nutritional quality 2710

selenium determination, AAS 2711

Benomyl determination, LC 2759

Benzoic acid determination, HPLC 2475

Berthelot/Kjeldahl wet digestion reac-
tion, biological material 2431Beverages, vitamin C determination,
HPLC 2783Bibliometric analysis of cheese
literature 2628

Biogas, methane formation 2439

Biological materials

Kjeldahl wet digestion/Berthelot
reaction 2431

nitrate determination, GC 2432

Biomass, algal 2445-6

Bioreactor, design and operation 2441

Bluefish, packaged, microbial quality
2669

Blue-green algae See algae

Botryodiplodia theobromae grape spoilage
control 2588

Bread

nutritional evaluation 2605

organoleptic property 2607

protein-enriched 2604

quality, effect of additive 2606

Bream, pesticide residue 2672

Brewery material recycling 2709

Brinjal

dehydration, osmotic 2553

preservation 2554

Broad bean

cooking quality 2522

physical property 2522

vicine and convicine metabolism
in rat 2523

Broiler meat

cholesterol

effect of age 2661

effect of sex 2661

vitamin B₆

effect of age 2661

effect of sex 2661

Brosme brosme See cusk

Browning, olive 2592

Buttermilk, aflatoxin M₁ stability 2614

Butylated hydroxyanisole

inhibitory activity

effect of calcium 2476

effect of magnesium 2476

Byssoschlamys fulva See yeast

Cadmium

cereal flour 2494

cereals 2494

food 2797

vegetables 2555

Caffeine 2700

carob products 2697

cocoa products 2697

teratogenicity 2701

Calcium

effect on antioxidant's inhibitory
activity 2476

effect of phytic acid in rat 2772

Callosobruchus maculatus, trehalase level
2751

Cancer and diet 2795

Can corrosion, egg pulp 2663

Capsicum annuum See peppers*Capsicum frutescens* See chilli

- Carbohydrate
 - pistachio kernel 2551
 - tomato 2572
- Carcinogens, beer 2712
- Carob products, caffeine determination 2697
- Carotenoid, of *Averrhoa carambola* fruits 2598
- Carp, pesticide residue 2672
- Cassava, fermented, hydrocyanic acid 2566
- Cell, migration measurement 2440
- Cereal flour, metals 2494
- Cereal pest, *Haplotinea insectella* 2782
- Cereal products, flavour compounds 2495
- Cereals
 - mashing 2491
 - metals 2494
- Cheese
 - cottage, from reconstituted milk powder 2630
 - literature, bibliometric analysis 2628
- Cheese whey, lactulose 2631
- Cherimoya analysis 2599
- Cherry
 - organoleptic property 2581
 - pectic substance 2593
- Chick pea
 - nucleotide 2524
 - starch digestion 2525
- Chinese vegetables
 - vitamin and mineral composition 2552
- Chitosan membranes for reverse osmosis 2601
- Chlordane toxicity 2762
- Chlorella vulgaris* See green algae
- Chloropropanediol, oil adulteration 2716
- Chlortetracycline, rockfish fillet preservation 2667
- Chocolate drink mix microbiological quality 2698
- Cholecalciferol See vitamin D
- Cholesterol
 - broiler meat
 - effect of age 2661
 - effect of sex 2661
- Cholesterol-fatty alcohol water behaviour 2739
- Chlorophyll, algal 2445-6
- Chromium, beer, determination, AAS 2711
- Cinnamom extract mutagenicity 2799
- Citric acid production
 - process 2439
 - raw material 2439
 - waste 2439
- Citrus juice
 - quality control 2690
- Citrus oil, aldehyde determination, GC 2730
- Citrus peel pigment purification 2692
- Citrus quality 2590
- Cleaning milk storage tank 2611
- Cocoa bean bacterial isolation during fermentation 2696
- Cocoa powder microbiological quality 2698
- Cocoa products
 - caffeine 2697
 - theobromine 2697
- Cocoa roasting 2695
- Coconut peroxidase 2547
- Cod
 - frozen, rancidity determination, thiobarbituric acid test 2668
 - polychlorinated hydrocarbon residue 2677
- Coffee
 - creamer, microbiological quality 2698
 - instant, composition 2699
- Coliform
 - milk 2623
 - effect on milk flavour 2624
- Collagen flounder 2681
- Colorant, shrimp, determination 2686
- Computer in sugar industry 2600
- Concanavalin A property 2779
- Confectionery
 - keeping quality 2602
 - quality 2602
 - water activity 2602
- Contamination
 - fruits and vegetables 2584
 - vegetables 2584
 - by cadmium 2555
 - by lead 2555
- Convicine metabolism in rat 2523
- Copper
 - cereal flour 2494
 - cereals 2494
 - food 2797
- Corrosion
 - egg pulp can 2663
 - metal by phosphine 2764

- Cottonseed flour, phenolic acid 2531
 Cottonseed oil
 fatty acid
 composition 2718
 determination, GLC 2719
 Cowpea
 Nigerian
 phosphorus 2519
 phytate 2519
 starch digestion 2525
 Crab meat, Egyptian, storage 2683
 Croaker, packaged, microbial quality 2669
 Crowberry, anthocyanin composition 2694
 Crowberry juice, anthocyanin composition 2694
 Cucumber, sugar composition 2579
Cucumis sativus See cucumber
Cucurbita ficifolia, sugar composition 2579
Cucurbita maxima, sugar composition 2579
Cucurbita pepo, sugar composition 2579
 Cusk
 collagen composition 2681
 pH 2681
 texture 2681
 Cutlet organoleptic property 2750
 Cyclopropenoid fatty acid, determination, HPLC 2733
Cynoscion regalis See trout

 Dace, pesticide residue 2672
 DDT
 residue, in Antarctic fish 2676
 toxicity 2762
 Dehuller for legume 2428
 Dehumidifier for drying 2408-9
 Dehydration See drying
 Deltametrin metabolism 2761
 Dessert, sweeteners use 2489
 Diabetics, guar gum and fructose 2775
 Diacetyl, *Streptococcus lactis* 2450
 Dibromochloropropane residue See pesticide residue
 Diet
 and cancer 2795
 pathogenesis 2800
 Dietary composition 2776
 Dietary lactose and metabolic activity 2777
 Diethylstilboestrol effect of ochratoxin 2801
 Diffusivity of potassium nitrate 2410

Dioscorea rotundata See yam
 Diseases, food borne 2807
 Dithane stability 2771
 Dough, fermentation, proteolysis 2603
 Dry bean See French bean
 Drying
 by dehumidifier 2408-9
 fruits 2580
 grain 2490
 grape 2587
 raisin 2589
 solar, fruits 2580
 spaghetti, effect on amino acid composition 2610
 wheat, effect on quality 2500

 Eel
 American, *Vibrio* isolation 2678
 pesticide residue 2672
 Egg
 phosvitin, iron release
 by food additives 2774
 by heat treatment 2774
 pulp, can corrosion 2663
 shell utilization 2602
 Egg plant See brinjal
 Electrical stimulation
 pork 2644
 effect on palatability 2645
 effect on quality 2645
 Energy
 conservation, heat exchanger 2425
 jojoba oil as source 2728
Engraulis anchoita See anchovy
 Enzymes
 in food industry 2439
 immobilized 2443
 peroxidase in coconut 2547
 polyphenol oxidase activity and browning in olive 2592
 Enzyme sensory system, fish freshness determination 2665
Eriobotrya japonica fat analysis, TLC 2740
 Erythorbate, cured meat, iron 2633
 Ethyl p-hydroxybenzoate, determination, HPLC 2475
 Extrusion, soy concentrate 2540

 Faba bean See broad bean
 Fat
 analysis 2734
 carbonyl compounds 2737
 edible, mineral oil 2738

- Fat (contd.)
 - fatty acid composition 2736
 - frying 2735
- Fatty acid 2736
 - algal 2445-6
 - cottonseed oil, determination, GLC 2719
 - cyclopropenoid, determination, HPLC 2733
 - groundnut 2720
 - oil and margarine 2717
 - rapeseed, Canadian 2532
 - soyabean oil *effect of* refining 2723
 - sunflower 2724
- Fatty alcohol water - cholesterol mixture behaviour 2739
- Fenozox residue, tomato 2576
- Fermentation
 - dough, proteolysis 2603
 - wine 2704
- Fermentation by-product analysis by GC 2444
- Fermented
 - cassava, hydrocyanic acid level 2566
 - soyabean curd preparation 2544
- Film evaporator 2427
- Firmness pectin gel 2483
- Fish
 - composition 2664
 - freshness determination, enzyme sensory system 2665
 - frozen, rancidity determination, thiobarbituric acid test 2668
 - organoleptic property 2671
 - packaged, microbial growth 2669
 - pesticide residues 2672
 - polybrominated anisole 2670
- Fish cake, dried salted, quality 2664
- Fish meal, amino acid determination, chemical test 2666
- Flavonoid, onion 2558
- Flavour
 - compounds, cereal products 2495
 - constituent
 - mushroom 2455
 - synthesis 2714
 - fruits 2581
 - milk, processed
 - effect of* coliforms 2624
 - wine 2707
- Flax See linseed flour 2531
- Flounder
 - collagen composition 2681
 - pH 2681
 - processing *for* protein product 2680
 - texture 2681
- Flour delivery 2407
- Food
 - amine 2708
 - metal composition 2797
 - microwave processing 2797
 - niacin determination, HPLC and microbial method 2437
 - refrigeration parameters 2424
 - rheology 2748
 - thermal property 2423
 - water determination 2435
- Food and Drug Legislation 2438
- Food borne diseases 2807
- Food consumption, energy intake 2791
- Food industry and agriculture 2400
- Food product
 - toxic metal contamination 2584
- Food production and pollution control 2404
- Food service, naval 2403
- Fortification, food 2792
- French bean protein 2526
- Frozen dessert, sweeteners use 2489
- Fructose See sugars
- Fruits
 - drying
 - solar 2580
 - organoleptic property 2581
 - polysaccharide determination 2582
- Fungal insecticide 2758
- Gadus morhua* See cod
- Galactose See monosaccharide
- Garlic, flavour constituents 2742
- Gas purification, microbiological method 2439
- Genetically engineered crop 2399
- Ghee, phulwara butter detection, TLC 2627
- Glass bottle recycling 2709
- Glass jar recycling 2709
- Globulin
 - cereal protein, tryptophan composition 2492
 - soy protein 2537
- Glucose See sugars
- Glucose-lysine Maillard reaction 2429
- Glutelin, cereal protein, tryptophan composition 2492

- Gluten
wheat protein, property 2501
- Glycinin, soyabean 2537
- Glycoalkaloid See alkaloid
- Glycosidase from *Pseudomonas fluorescens* 2449
- Grape
drying 2587
solar 2580
spoilage control 2588
- Grape juice
quality
effect of stabilization 2689
effect of storage 2689
- Green algae See algae
- Groundnut 2548
aflatoxin determination, GC/MS 2550
calcium determination, methyl
thymol blue method 2549
fatty acid composition 2720
- Groundnut flour, phenolic acid 2531
- Guar gum
for controlling hyperglycemia 2775
viscoelasticity 2484
- Gum arabic, γ -irradiation 2485-6
- Hake
frozen, rancidity determination,
thiobarbituric acid test 2668
kamakoko manufacture 2679
- Ham
cooked
effect of pH 2653
effect of phosphate 2653
effect of water hardness 2653
processing 2652
- Haplotinea insectella*, stored cereal
pest 2752
- Harmone radioimmunoassay 2434
- Heat exchanger 2426
energy conservation 2425
- Heat stability
milk 2613
skim milk concentrate 2618
- Helianthus annuus* See sunflower seed
- Heptanone, organoleptic property 2747
- Herbicide, microbial 2442
- Herring
frozen, rancidity determination,
thiobarbituric acid test 2668
sugar salted
ripening 2673-4
spoilage 2673-4
- Homogenised milk and atherosclerotic
disease 2626
- Horse gram, starch digestion 2525
- Horse mackerel, frozen, rancidity
determination, thiobarbituric acid test
2668
- Horse-radish, flavour constituent deter-
mination 2742
- Human milk, mirex residue 2625
- Hydrocarbon, beer 2712
- Hydrocyanic acid, fermented cassava 2566
- Hypersensitivity to food 2786
- Ice cream, succinylated whey protein
concentrate 2632
- Immobilized enzymes 2443
- Indian scientific and technological deve-
lopment 2398
- Insect attractant, red clover leaves,
volatile component 2770
- Insecticide
bacterial 2758
fungal 2758
microbial 2442, 2758
viral 2758
- Iron
composition in rat 2773
cured meat 2633
egg yolk phosovitin
effect of food additive 2774
effect of heat treatment 2774
- Irradiation, effect on wheat dough
rheology 2608
- Jojoba oil, energy source 2729
- Kaempferol, onion 2558
- Kahawai, brain destruction and muscle
metabolism 2682
- Kamboko See hake
- Karaya gum, viscoelasticity 2484
- Kishk, soyabased, preparation 2545
- Kjeldahl 2430
- Kjeldahl wet digestion/Berthelot reaction,
biological material 2431
- Lactarius trivialis* See mushroom
- Lactic acid bacteria preservation 2448
- Lactulose from cheese whey 2631
- Lead
cereal flour 2494
cereals 2494
food 2797
vegetable contamination 2555
wine 2703
- Leafy vegetables, vitamin and mineral
composition 2552

- Legislation
 food and drug 2438
 pollution control due to pesticide 2404
- Legumes
 dehulling 2428
 Nigerian
 phosphorus 2519
 phytate 2519
 vitamin and mineral composition 2552
- Lima bean
 Nigerian
 phosphorus 2519
 phytate 2519
- Limanda ferruginea* See flounder
- Lindane toxicity 2762
- Linoleic acid oxidation in mandarin 2591
- Linseed flour, phenolic acid 2531
- Lipase, yeast 2458
- Lipid
 algal 2445-6
 composition and oxidation 2731
 potato, French-fried 2565
 serum 2776
 soy milk 2542
- Lucerne, trypsin inhibitor activity 2569
- Lycopersicon esculentum* See tomato
- Lysine
 fish meal, determination, chemical test 2666
 spaghetti, effect of drying 2610
- Lysine-glucose Maillard reaction 2429
- Mackerel
 frozen, rancidity determination, thiobarbituric acid test 2668
- Madhuca butyracea* See Phulwara butter
- Magnesium
 effect on antioxidant inhibitory activity 2476
 effect of phytic acid in rat 2772
- Maillard reaction, lysine-glucose 2429
- Maize
 moisture determination 2493
 nitrogen determination 2493
 protein, tryptophan composition 2492
- Maize oil, fatty acid composition 2718
- Malnutriton
 food fortification 2792
 zinc 2785
- Mandarin, linoleic acid oxidation 2591
- Mango kernal fat property
 effect of hydrogenation 2741
- Mannose See monosaccharide
- Margarine, fatty acid composition determination, enzymatic 2717
- Meat
 analyzer, poultry meat 2659
 bacteriological quality 2635-8
 cured, iron composition 2633
 spoilage 2634
- Meat processing plant, bacteriological quality 2635
- Meat products, *Salmonella* 2637
- Melon organoleptic property 2581
- Mercury determination 2798
- Meronia americanus* See perch
- Methane from biogas 2439
- Methyl *p*-hydroxybenzoate determination, HPLC 2475
- Microbial herbicide 2442
- Microbial pesticide 2442
- Microbial plant growth regulator 2442
- Microbiological quality
 breaded shrimp 2685
 fishing packaged 2669
 food 2698
 grape spoilage 2588
 meat 2638
 processing plant 2635
 milk, effect of agitation 2622
 orange juice, frozen concentrated 2691
 packaged fish 2669
 sausage, vacuum packaged 2657
 shrimp, breaded 2685
- Microcystis aeruginosa* See blue green algae
- Micropogon undulatis* See croaker
- Microwave food processing 2422
- Milk
 aflatoxin M₁ stability 2614
 aseptically packaged, sedimentation and fat separation 2616
 bacteriological quality, agitation 2622
 bovine's, xanthine oxidase 2617
 coliform detection 2623
 colour changes 2619
 composition 2619
 cow's, vitamin D 2621
 heat stability and urea composition 2613
 homogenized and atherosclerotic disease 2626
 human, vitamin D 2621
 organoleptic property 2619

k (contd.)

polymer packaging material migration 2615

post-pasteurization contamination 2612

processed, flavour, effect of coliforms 2624

storage tank cleaning 2611

urea and heat stability 2613

vitamin
effect of heat 2620

effect of storage 2620

lk powder 2630

lk products, colour changes 2619

nerals

apple 2597

legumes 2582

vegetables 2552

rex residues, human milk 2625

isture, cereals 2493

nosaccharide, tomato 2574

uld, meat 2634

wrah fat property effect of

hydrogenation 2741

ng bean, trypsin inhibitor 2527

scle

bovine's changes during storage

2641-2

metabolism in Kahawai 2682

shroom 2451

flavour constituent 2455

keeping quality 2452

organoleptic property

effect of freezing 2453.

Sporothrix schenckii isolation 2456

water sorption 2454

stard flour, phenolic acid 2531

stard oil, allyl isothiocyanate com-

position, determination 2721

tagency, soy sauce 2543

cotoxin

Alternaria fruits and vegetable

products 2583

Aspergillus 2803

Penicillium 2803

val food service 2403

phrocalcinosis due to diet 2800

acin, food, determination, HPLC

nd microbial method

trate

biological material 2432

pork 2647

trile

pork 2647

Nitrite, cured meat, iron 2633

Nitrogen

effect on algae 2445

cereals 2493

chick pea 2524

Nutrition and health 2787

Nutritional criteria, USDA 2788

Nutritional quality, beer 2710

Nutritional standards for army 2789-90

Oat

moisture determination 2493

nitrogen determination 2493

quality 2490

tryptophan composition 2492

Oat flake

moisture determination 2493

nitrogen determination 2493

Ochratoxin A

effect of diethylstiboesterol 2801

effect of zearalenone 2801

Oils

chloropropanediol adulterated 2716

essential, composition 2714

fatty acid composition, determination, enzymatic 2717

Oilseed flour, phenolic acid 2531

Okra

drying 2553

preservation 2554

Olea europaea See olive

Oligosaccharide, soyabean 2535

Olive, polyphenol oxidase activity and

browning 2592

Onion

drying 2557

flavonoid distribution 2558

Orange juice

frozen concentrated, microbial

quality 2691

off-flavour due to peel pigment 2692

Organochlorine pesticide residue, fish

2672

Organoleptic property 2746

bread 2607

cutlet 2750

fish 2671

fruits 2581

heptanone 2747

Oscillatoria rubescens See blue green

algae

Osmosis, chitosan membrane 2601

Osmotic dehydration of okra 2553

Oxylamine, spinach nitrate reductase

complex 2570

- Packaged fish, microbial quality 2669
Packaging 2411
 material 2412
 migration *into* milk 2615
Palm oil
 fractionation 2729
 processing, traditional 2728
Passion fruit 2585
Pasta
 microwave processing 2422
 processing by microwave 2422
Pathogenesis *due to* diet 2800
Pea
 albumin 2528
 composition 2529
 moisture determination 2493
 protein quality 2529
Peach
 organoleptic property 2581
 pesticide residues 2595
 slice, sterilized, influence of
 tin and tin free steel 2594
Pear
 organoleptic property 2581
 slice, sterilized, influence of
 tin and tin free steel 2594
Pectin
 gel firmness 2483
 property 2481
 rheology 2482
 tomato 2572
Penicillium, mycotoxin 2803
Perch
 packaged, microbial quality 2669
 pesticide residue 2672
Peroxidase See enzymes
Pest control, developing country 2756
Pesticide
 application 2752
 pollution control legislation 2404
 safety 2752
Pesticide residue
 Antarctic fish 2676
 mirex, human milk 2625
 peach 2595
Phaseolus vulgaris See French bean
Phenolic acid, oilseed flour 2531
Phenolic antioxidants, antimicrobial
 activity 2476
Phosphate
 effect on cooked ham 2653
Phosphine
 metal corrosion 2764
 toxicity to *Trogoderma* 2765
Phosphorus, Nigerian legumes 2519
Phosvitin
 egg yolk, iron release
 by food additive 2774
 by heat treatment 2774
Phulwara butter, ghee adulteration,
 detection, TLC 2627
Phytate, Nigerian legumes 2519
Phytic acid effect on metals in rat
 2772
Pig carcass
 Campylobacter jejuni 2660
Pike, pesticide residue 2672
Pimento
 drying 2553
 preservation 2554
Pineapple, organoleptic property 2581
Pineapple effluent, single cell protein
 production 2586
Pistachio
 Iranian
 carbohydrate 2551
 protein 2551
Pisum See peas
Plantain, single cell protein 2460
Plantain product fluid loss 2578
Plant growth regulator, microbial
Plastics for packaging 2412
Pollution control and food production
 2404
Polybrominated anisole
 fish 2670
 shellfish 2670
Polychlorinated biphenyl residue 2763
 Antarctic fish 2676
Polychlorinated hydrocarbon, cod 2677
Polychlorinated pesticide residue, fish
 2672
Polydextrose in frozen dessert 2489
Polyethylene glycol, antimicrobial
 activity 2477
Polymer migration *into* milk 2615
Polyphenol oxidase See enzymes
Polysaccharide, fruits and vegetables
 2582
Pomatomus saltatrix See bluefish
Pork
 bacteriological quality and electrical
 stimulation 2644
 chilled
 palatability effect of electrical sti-
 mulation 2645
 quality, effect of electrical sti-
 mulation 2645

- Pork (contd.)
 - chops 2643
 - composition 2649
 - cured
 - nitrate 2647
 - nitrile 2647
 - electrical stimulation and bacteriological quality 2644
 - fat, texture 2651
 - lysosome 2640
 - myofibrillar protein, myosine denaturation 2650
 - rancidity effect of sodium chloride 2648
 - volatile components 2646
- Potassium nitrate, diffusivity 2410
- Potassium sorbate
 - effect on bacon keeping quality 2654
 - vegetable preservation 2554
- Potato
 - French-fried
 - damage due to transport and handling 2560
 - effect of cryogenic temperature 2560
 - glycoalkaloid 2561
 - toxicity 2563
 - lipid 2565
 - starch
 - hydrolysis by solar energy 2562
 - mutagenicity, AMES test 2564
 - sulphitation 2559
 - thermal sulphitation 2556
- Poultry meat
 - microwave processing 2422
 - Campylobacter jejuni* 2660
 - super scan meat analyser 2659
- Preservation
 - lactic acid bacteria 2448
 - rockfish fillet 2667
- Preservatives, effect on *Aspergillus parasiticus* 2479
- Prolaine, cereals 2492
- Propionate effect on *Aspergillus parasiticus* 2479
- Propyl-p-hydroxybenzoate
 - determination, HPLC 2475
 - vegetable preservation 2554
- Protein
 - adjuki bean 2520
 - algal 2445-6
 - bread 2604
 - Protein (contd.)
 - cereal's 2492
 - digestibility determination 2781
 - french bean 2526
 - hydrophobicity determination 2436
 - ninhydrin-reactive lysine 2780
 - pistachio kernel 2551
 - rapeseed 2533-4
 - source, PAG guidelines 2778
 - effect of soy milk 2542
 - white wine 2705
 - yam 2567
 - Proteolytic activity, sunflower seed 2546
 - Prunus organoleptic property 2581
 - Prunus avium* See cherry
 - Pseudomonas fluorescens*
 - glycosidase 2449
 - Psophocarpus tetragonolobus*
 - See winged bean
 - Pyrethroid stabiliser 2760
 - Quality control 2402
 - Quercitin, onion 2558
 - Rabbit muscle effect of aging 2655
 - Radioimmunoassay hormone 2434
 - Raisins, drying 2589
 - Rancidity frozen fish, determination, thiobarbituric acid test 2668
 - Rapeseed
 - fatty acid composition 2532
 - protein-rich product 2533-4
 - Rapeseed flour, phenolic acid 2531
 - Rapeseed oil
 - allyl isothiocyanate composition determination 2721
 - chloropropanediol adulteration 2716
 - hydrogenation 2722
 - Raw material 2401
 - citric acid production 2439
 - Red clover leaf, insect attractant 2770
 - Refining
 - soyabean oil
 - effect on fatty acid 2723
 - effect on triglyceride 2723
 - Refrigeration, food 2424
 - Retort pouch 2414
 - testing device 2415
 - thermal processing 2418
 - Rhamnose See monosaccharide
 - Rheology
 - food 2748
 - pectin 2482

- Riboflavin See vitamin B₆
- Rice
 tryptophan 2492
 water diffusion during soaking 2496
- Rice bran
 property 2497
 stabilizer 2498
- Rice diet, algal protein supplementation 2447
- Ripening, herring, sugar-salted 2673-4
- Rockfish fillet
 preservation
 by potassium sorbate and chlortetracycline 2667
 by tetrasodium ethylene diamine tetraacetate and chlortetracycline 2667
- Rodent
 damage to food 2766
 response to neurotoxicant
- Rodenticide 2768
 acrylonitrile 2769
- Rye
 moisture determination 2493
 nitrogen determination 2493
 processing 2490
 protein 2492
- Saffron
 chemistry 2743
 processing 2743
 standardization 2743
- Sal fat, property effect of hydrogenation 2741
- Salmonella
 meat products 2637
 survival 2806
- Sausage 2656
 bologna
 colour stability 2658
 rancidity 2658
 vacuum packed, microbial quality 2657
- Scenedesmus obliquus* See green algae
- Scientific and Technological Development, Indian
- Seatrout See trout
- Sechium edule*, sugar composition 2579
- Selenium, beer, determination, AAS 2711
- Sesame seed flour, phenolic acid 2531
- Shellfish, polybrominated anisole 2670
- Shrimp
 colorant determination 2686
 frozen, bacteriological quality effect of processing 2684
 microbiological quality during processing 2685
 vibrio thermal inactivation 2687
- Shrimp paste, colorant determination 2686
- Single cell protein 2459
 from green plantain 2460
 from pineapple effluent 2586
- Skim-milk concentrate, heat stability 2618
- Sodium chloride, effect on pork rancidity 2648
- Sodium nitrite effect on bacon keeping quality 2654
- Soft drinks, emulsifier stability and opacity
 effect of clouding agent 2688
- Solar drying, fruits 2580
- Solar energy, potato starch hydrolysis 2562
- Sorbate, effect on *Aspergillus parasiticus* 2479
- Sorghum, tryptophan composition 2492
- Soyabean
 moisture determination 2493
 Nigerian
 phosphorus 2519
 phytate 2519
 nitrogen determination 2493
 oligosaccharide 2535
- Soyabean curd, fermented, preparation 2549
- Soyabean flour, phenolic acid 2531
- Soyabean oil
 refining effect on fatty acid and triglyceride 2723
- Soyabean product, cream soup 2539
 kishk, preparation 2545
 tofu preparation 2541
- soy concentrate effect of extrusion 2540
- Soy milk 2542
- Soy protein 2535
 emulsion stabilising property 2536
 gelation 2537
- Soy sauce, mutagenicity 2543
- Spaghetti, aminoacid effect of drying 2610
- Spinach
 ascorbic acid composition 2571

- Spinach (contd.)
 nitrate reductase complex,
 oxylamine inhibition 2570
Spinacia oleracea See spinach
Spirit quality 2702
Spirulina platensis See blue green
 algae
Spoilage
 grape 2588
 herring, sugar salted 2673-4
 meat 2634
Sporothrix schenckii See mushroom
Stabilising property of soy protein
 2536
Staphylococcus aureus, phenolic anti-
 oxidant, antimicrobial activity 2476
 polyethylene glycol antimicro-
 bial activity 2477
 survival 2806
Starch
 legume's, digestion 2525
 potato's, hydrolysis by solar
 energy 2562
 wheat's, quality 2502
 winged bean 2530
Storage
 Egyptian crab meat 2683
 frozen milk effect on vitamin 2620
Strawberry, organoleptic property 2582
Streptococcus lactis
 acetoin formation 2450
 diacetyl formation 2450
Sugars
 cucumis 2579
 cucurbita 2579
 sechium 2579
 winged bean 2530
Sugar industry, computer application
 2600
Sulphitation, potato 2559
Sunflower butter, allergen contamina-
 tion 2726
Sunflower oil
 fatty acid composition 2724
 moisture 2725
Sunflower seed, proteolytic activity
 2546
Sweetener
 frozen dessert 2489
 synthetic, regulation 2488
Synthetic sweetener, regulation 2488
Talin protein 2487
Tangerine See mandarin
Teratogenicity, caffeine 2701
Texture
 flounder 2681
 pork fat 2651
Thaumatic, sweetener 2487
Thaumatococcus danielli, sweet proteina-
 ceous extract 2487
Theobromine
 carob products 2697
 cocoa products 2697
Theophylline-9- β -D-glucopyranosyl-6-
 monophosphate See nucleotide
Thermal diffusivity, vegetables 2556
Thermal inactivation, *vibrio* shrimp 2687
Thermal property, food 2423
Thiamine
 milk
 effect of heat 2620
 effect of storage 2620
Thiobarbituric acid test, frozen fish
 rancidity, determination 2668
Tofu 2541
Tomato
 Australian, composition 2573
 carbohydrate 2572
 composition and pH 2573, 2575
 drying 2553
 fenofox residue
 monosaccharide 2574
 pectin 2572
 pH and composition 2575
 preservation 2554
 thermal diffusivity 2556
Topping, microbial quality 2698
Toxicity, metals effect of phytic acid
 in rat 2772
Transport
 cost 2405
 optimisation 2406
Tray pack 2419-21
Trehalose
 Callosobruchus maculatus 2751
 Tricholoma equestre See mushroom
Triglyceride, soyabean oil, effect of
 refining 2723
Trogoderma granarium, phosphine toxicity
 2765
Trout
 packaged, microbial growth 2669
 pesticide residue 2672
Trypsin
 bambara pea 2521
 lucerne 2569
 winged bean 2530

- Turmeric quality 2744
- Urea, milk 2613
- Urophycis chuss* See hake
- Vegetable oil, argemone oil detection 2715
- Vegetable product, toxic metal contamination 2584
- Vegetables
- contamination
 - by cadmium 2555
 - by lead 2555
 - drying 2553
 - mycotoxin determination, HPLC 2583
 - polysaccharide determination 2582
 - preservation, determination 2582
 - preservation 2554
 - thermal diffusivity 2556
 - vitamin and mineral composition 2552
- Vibrio cholerae*, American eel 2678
- Vicia faba* See broad bean
- Vicine metabolism in rat 2523
- Vigna angularis* See adjuki bean
- Vigna mungo* See mung bean
- Viral insecticide 2758
- Vitamin
- legumes 2552
 - milk and milk products 2619
 - vegetables 2552
- Vitamin B₆, broiler meat
- effect of age and sex 2661
 - milk, effect of heat and storage 2620
- Vitamin C 2782
- determination, HPLC 2783
 - spinach 2571
- Vitamin D, milk 2621
- Voandzeia subterranea* See bambara pea
- Volatile constituents, pork 2646
- Volvariella volvacea* See mushroom
- Wastes
- in citric acid production 2439
 - gas purification, microbiological method 2439
 - purification in food industry 2439
- Wheat
- dough
 - effect of amylase 2609
 - property effect of γ -irradiation 2608
 - rheology, effect of γ -irradiation 2608
- Wheat (contd.)
- milling 2490
 - moisture determination 2493
 - nitrogen determination 2493
 - production 2490
 - protein 2501
 - tryptophan 2492
 - quality 2499
 - effect of drying 2500
 - starch quality 2502
- Wheat diet, β -gal protein supplementation 2447
- Whey preparation and use 2439
- Whey protein concentrate
- ice cream 2632
- Wine
- aroma 2702
 - arsenic contaminated 2703
 - champagne, flavour 2707
 - Israeli
 - fermentation changes 2704
 - post-fermentation changes 2704
 - lead contaminated 2703
 - quality, effect of aroma 2702
 - Venetian's, differentiation 2706
 - white, protein 2705
- Winged bean
- starch 2530
 - sugar 2530
 - trypsin 2530
- Xanthine oxidase, bovine milk 2617
- Xerocomus badius* See mushroom
- Xylose See monosaccharide
- Yam, protein 2567
- Yeast
- baker's, fermentation capacity 2457
 - lipase production 2458
- Zearalenone, effect on ochratoxin 2801
- Zinc
- deficiency 2784
 - protein calorie malnutrition 2285

Blue VR's, effect on bone marrow chromosome of mice 2849

Bovine

carcass

organochlorine pesticide residues 3011

organophosphorus pesticide residues 3011

protein-protein interaction 3010

Bran, ergot alkaloid determination, HPLC 3099

Bread

baking quality 2960

baking test 2955

balady

baking 2963

quality 2962

staling 2962

starch gelatinization 2962

defatted wheat flour based 2966

dietary fibre determination 2958

effect of oils and fats 2964

enrichment by dietary fibre 2958

pan baking 2963

production 2965

rye bread, baking test 2955

volume 2959, 2961

wheat/rice flour based, volume 2959

Broiler carcass, microbiological evaluation 3025

Bruchid resistance, cow pea 2901

Buffalo carcass, slaughtering 3002

Butter lipolytic enzyme 2990

Butter milk, salted and sweetened, quality 2988

Caffeine, aflatoxin inhibition 3101

Cake

industrial production 2968

lipid properties 2969

Calcium, skim milk 2985

Calcium chloride

sweet potato peeling 2926

taro peeling 2926

Callosobruchus maculatus, french bean lectin toxicity 2903

Campylobacter jejuni, turkey processing plant, isolation 3026

Canned green bean spoilage by *Bacillus stearothermophilus* 2904

Capillary separation method 2822

Captan, corn moth control 3078

Carapa porocera, fatty acid composition 3054

Carbohydrate, protein 2947

Carbondioxide, pork spoilage control 3020

Carcinogenicity, fruit juice 3044

Carica papaya See papaya

Carp myosin, proteolytic contamination 3035

Caryophyllum inophyllum, fatty acid composition 3054

Casein peptide, HPLC 2986

Cassava

cyanide determination, enzymatic 2929

cyanoglucosidase determination, spectrometry 2930

marketing 2928

Cassava products, cyanide determination, enzymatic 2929

Catering establishment, microbiological survey 3111

Cellulose, bacterial fermentation 2843

Cereals

amylase activity measurement, falling number method 2856

methionine determination, GLC 2900

milling test 2854

mineral 3090

phytate 3090

starch, amylose determination, colorimetry 2857

Channa, microbiological quality 2987

Cheese

aflatoxin M₁ determination 2993-4

proteolytic enzyme 2992

refrigeration 2991

Chemiluminescence analysis recent developments 2821

Chicken

frankfurter, *Clostridium botulinum*, effect of polyphosphate 3024

Salmonella, effect of temperature 3007

Staphylococcus aureus, effect of temperature 3007

Chicory as flavouring agent for coffee 3049

Chilling

avocado

effect on ethylene production 2943

effect on respiration 2943

Chitin, banana, effect of fungal infection 2938

Chocolate 2954

Cholesterol

in milk, determination, HPLC 2976

effect of protein 3084

-C-

- Cholesterol (contd.)
 effect of protein 3084
- Chromatography, time-constant differentiation 2825
- Citrus, variety, new 2939
- Citrus latifolia* See lime
- Citrus products, counter current extraction 2937
- Citrus reticulata* See mandarin
- Citrus unshiu*, ethylene-forming enzyme 2940
- Clostridium botulinum*
 bacon, inhibition 3021
 chicken frankfurter effect of polyphosphate 3024
 growth 3107
 ham, inhibition 3021
 toxin extraction 3109
- Clostridium sporogenes*, heat resistance 3108
- Clove oil, lipid 3070
- Coccinia grandis* See scarlet gourd
- Coconut
 desiccated, spoilage by fungus 2915
 drier 2914
- Cod, phospholipid enzymatic hydrolysis 3036
- Coffee
 chicory as flavouring agent 3049
 curing using fungal pectic enzyme 3048
 pulping, portable unit 3047
- Contamination of groundnut by aflatoxin 2918
- Copra See coconut
- Cost/benefit analysis, food quality control 2970
- Cottonseed
 processing practice 2907
 protein characterization 2909
- Cow pea, bruchid resistance 2901
- Crambe 2908
- Cryptolestes ferrugineus*
 control
 by fenitrothion 3081
 by malathion 3081
 infestation of stored wheat 2881
 wheat infested
 effect on fat acidity 2880
 effect on germination 2880
 effect on microflora 2880
- Curcumin in turmeric, determination, HPLC 3069
- Curring coffee by fungal pectic enzyme 3045
- Cyanide in cassava, determination, enzymatic 2929
- Cyperus esculentus*, nutritive value 2931
- Dairy products, recombined 2971
- Decortication, effect of sorghum digestibility 2898
- Dehydrated herbs, microbiological quality 3068
- Dehydrated spices, microbiological quality 3068
- Dennettia tripatela* composition 2946
- Dietary fibre
 bread enrichment 2958
 extrusion cooking 3091
- Dough development 2957
- Drier coconut 2914
- Drying
 groundnut on farm 2916
 spray drying plant 2819
- Dyes, synthetic, in alcoholic products, determination, HPLC 2848
- Egg, nutritive value 3027
- Energy
 consumption
 during sterilization 2814
 sugar industry 2951
 groundnut drying 2916
- Enzymes
 cloning in fermentation industry 2830
 electrode in lysine determination 2833
 in fructose syrup production 2832
 fungal pectic enzyme in coffee curing 3045
 polygalacturonase isoenzyme in tomato 2933
 production, thermostable 2831
- Ergot alkaloid in grain and grain products, determination, HPLC 3099
- Escherichia coli*
 in broiler carcass 3025
 lipopolysaccharide 3103
- Ethylene forming enzyme, *Citrus unshiu* 2940
- Extrusion, effect on sorghum digestibility 2898
- Extrusion cooking and dietary fibre 3091

Fat

absorption and bile acid circulation
3083

acidity 2855

wheat effect of *Oryzaephilus*
surinamensis and *Cryptolestes*
ferrugineus 2880

crystalization 3062

utilization in baking industry 3053

Fatty acid

composition 3063

jack fruit 3072

mace 3072

Fatty food flavour stability 3074

Fenitrothion

Cryptolestes ferrugineus control 3081

Tribolium castaneum control 3081

Fermentation

cellulose by bacteria 2843

industry, enzyme cloning 2830

olive oil waste 3060

Field pea, classification 2902

Firmness, maize 2887

Fish

histamine-forming bacteria 3033

Flavour

cow's and goat's milk 2978

stability in fatty food 3074

Flavour compounds, S-alk(en)yl-L-
cysteine sulfoxide in onion 2921

Flour weighing 2811

Fluid separation 2817

Fluorescence analysis, recent develop-
ments 2821

Fluorimetric semiautomatic catalytic
titration 2824

Folacin, food, measurement by micro-
biological method 3087

Food

ascorbic acid determination, HPLC
3086

folacin composition measurement,
microbiological method 3087

ionizing treatment 2815

microbiological quality 3104, 3110

mycotoxin determination, TLC 3100

nitrate and nitrite determination
2829

nutritional quality 3094

packaging 2815

preservation by microwave heating
2813

quality control, cost/benefit
analysis 2970

Food (contd.)

rheology 3075

salmonella detection, DNA-DNA
hybridization assay 3105

sterilization by microwave heating
2813

styrene monomer determination 3096

thiamin determination, HPLC 3 6

tocopherol determination, fluorome-
try 3088

Food and health 3092

Freeze-drying, minced meat, *Staphylo-*
coccus aureus isolation and survival
2997

Freezing

skim milk concentrate 2984

tomato 2932

French bean, lectin toxicity to
Callosobruchus maculatus 2903

Fructose syrup production, enzyme
reaction 2832

Fruit juice, carcinogenicity 3044

Fruit products, ascorbic acid stability
2936

Fruits

dietary fibre determination 2958

nutrition and disorder 2935

vitamin C stability 2936

Fungal amylase activity measurement,
falling number method 2856

Fungi

effect on banana chitin 2938

desiccated coconut spoilage 2915

Fungicide, citrus rot control 2941

Gelatin, ice cream 2995

Gelling of pectin 2850

Genetic engineering 2808-9

Germination, wheat, effect of *Oryzae-*
philus surinamensis and *Cryptolestes*
ferrugineus 2880

Glucan wheat 2873

Glucose-fructose mixture 2949

Glutenin wheat 2877

Goat meat, criollo's, characteristics
3015

Grape

must concentrate 3050

packaging 2816

Grape products, counter current
extraction 2937

Green bean, canned, spoilage by
Bacillus stearothermophilus 2904

- Groundnut
 - aflatoxin
 - contamination 2918
 - extraction by AOAC method 2919
 - oil recovery 3055
 - on-farm drying 2916
 - processing practice 2907
 - storage temperature profile 2917
- Groundnut and rice bran flour blend, properties 2920
- Groundnut butter, aflatoxin determination, LC 3066
- Guava, ascorbic acid stability 2936
- Gums, ice cream 2995
- Ham, *Clostridium botulinum* inhibition 3021
- Hamburger protein, effect of heat processing 3012
- Heat processing, effect on hamburger's protein 3012
- High performance liquid chromatography 2826
- Histamine-forming bacteria in fish 3033
- Hoeppler-hardness 3052
- Homogenization, effect on milk fat globule distribution 2974
- Honey composition and characteristics 2953
- Hormone, juvenile 3076
- Hyptis suaveolens* oil fatty acid composition 3055
- Ice cream stabiliser 2995
- Impedance of irradiated potato 2924
- Industrial robot 2820
- Industry
 - management 2812
 - propionibacterium application 2844
- Infant feed and weaning practice 3095
- Insect control by pheromone 3077
- Insecticide, resistance of *Musa domestica* 3080
- Insect resistance, cow pea 2901
- Ionizing treatment of food 2815
- Irradiated potato, impedance 2924
- Irradiation of maize, effect on alcohol production 2892
- Italian millet flour, hydration 2858
- Italian millet starch, hydration 2858
- Jackfruit, lipid and fatty acid composition 3072
- Jalapeno pepper pungency 3071
- Jam, patulin 3044
- Jowar flour hydration 2858
- Jowar starch hydration 2858
- Keeping quality
 - beef steak gas packaged 3009
 - mackerel, salted, dried and packaged 3037
 - poultry meat 3023
- Lamb electrical stunning 3014
- Lamb meat, pH 3013
- Lectin, french bean, toxicity to *Callosobruchus maculatus* 2903
- Legumes, methionine determination, GLC 2900
- Lemon oil composition 3058
- Lime, fungal control 2941
- Lipase
 - cow's and goat's milk 2978
 - oat 2885
- Lipids in clove oil 3070
 - jack fruit 3072
 - mace 3072
 - oat 2886
- Lipid-starch complex 2952
- Lipolytic enzyme
 - butter 2990
- Lipopolysaccharide, *Escherichia coli* 3013
- Loligo duvauceli* See squid
- Lysine
 - determination 3085
 - enzyme electrode 2833
 - wheat's modification 2878
- Mace, lipid and fatty acid composition 3072
- Mackerel
 - salted and dried
 - keeping quality
 - effect of chemical treatment 3037
 - effect of packaging 3037
- Maize
 - alcohol production, effect of γ -irradiation 2892
 - fat acidity 2855
 - firmness 2 87
 - grain yield 2891
 - oil, nutritive value 2891
 - starch 2889
 - hydration 2858

Maize (contd.)

syrup, saccharide determination,
HPLC 2890

zein protein 2888

Malathion

Cryptolestes ferrugineus control
3081

Tribolium castaneum control 3081

Maleic hydrazide effect on potato
composition 2922

Malva parviflora oil fatty acid compo-
sition 3059

Mandarin, fungal control 2941

Mango

packaging 2816

processing 2942

Manihot esculenta See cassava

Marketing, cassava 2928

Mastitis, effect on milk 2972

Meat

Campylobacter jejuni survival 2998

minced, freeze drying effect of

Staphylococcus aureus 2997

Meat products

nitrite determination, AOAC method
2999

restructured 3000

Metanil yellow, effect on bone marrow
chromosome of mice 2849

Methionine, cereals, determination, GLC
2900

Microbiology, apple and apple products
2944

Microbiological quality

beef steak vacuum packed 3008

cow's and goat's milk 2978

food 3110

Microflora

wheat, effect of *Oryzaephilus surina-
mensis* and *Cryptolestes ferrugineus*
2880

Microwave

cooked pork 3016

preservation of food 2813

sterilization of food 2813

Milk

bacterial isolation and identifica-
tion 2980

cholesterol determination, HPLC 2976

cow's

flavour 2978

in goat milk, determination 2977

keeping quality 2978

lipase 2978

Milk, (contd.)

microbiological quality 2978

protease 2978

derancidification 2975

fat globule distribution, effect of
homogenization 2974

goat's

flavour 2978

keeping quality 2978

lipase 2978

microbiological quality 2978

protease 2978

effect of mastitis 2972

microbiological quality 2978, 2981, 2987

Salmonella detection

by Felix-01 bacteriophage 2981

by HPLC 2981

somatic cell determination 2979

spray drying

effect on bacteria 2973

effect on enzyme 2973

Streptococcus inhibition 2982-3

Milling test

cereals 2854

wheat 2866

Minerals

cereals 2868, 3090

potato, effect of maleic hydrazide
2922

wheat 2868

Miso rheology 3075

Moisture, white bean 2905

Moth control by *Bacillus thuringiensis*
3078

Musa domestica

resistance to insecticide 3080

Mushroom

composition 2836

cultivation 2836

tyrosine hydroxylation 2835

Mycotoxin, food, determination, TLC 3100

Neutralizing agents, organoleptic
evaluation 3073

Nitrate in food 2829

Nitrite

food 2829

meat products, determination, AOAC
method 2999

potato, effect of maleic hydrazide
2922

Nitrosodimethylamine, squid products
3042-3043

Nitrosopyrrolidine, bacon, determination
3022

- Noodle colour 2956
 Nutritional problems of India 3093
 Nutritional quality of food 3094
- Oat
 lipase activity 2885
 lipid extraction 2880
- Ochratoxin A
 wheat bran, determination, HPLC 2883
- Ogi, aflatoxin B₁ 2899
- Oils, utilization in baking industry 3053
- Oilseeds
 composition 2908
 processing practice 2907
- Olive oil waste, microbial fermentation 3060
- Onion flavour compounds 2921
- Orange juice 3045
- Orange packaging 2816
- Organochlorine pesticide residues
 bovine carcass 3011
 procine 3011
- Organoleptic property
 beef steak vacuum packaged 3008
 neutralizing agents 3073
 sausage 3028
- Organophosphorus pesticide residues
 bovine carcass 3011
 procine 3011
- Oryzaephilus surinamensis*, wheat infestation
 effect on fat acidity 2880
 effect on germination 2880
 effect on microflora 2880
- Packaged
 gas, beef steak keeping quality 3009
 vacuum, beef steak
 microbiological quality 3008
 organoleptic property 3008
- Packaging
 fruits and vegetables 2816
 mackerel salted and dried, keeping quality 3037
- Paddy steam treatment and milling property
- Papain immobilization 2834
- Papaya seed oil, fatty acid composition 3054
- Paste colour 2956
- Patulin in jam 3044
- Pearl millet rancidity 2894
- Pear products counter current extraction 2937
- Pectin gelling 2850
- Penaeus indicus* See prawn
- Pennisetum americanum* See pearl millet
- Pentachlorophenol residue in tallow 3067
- Phaseolus vulgaris* See french bean
- Pheromone in insect control 3077
- Phosphate, rice stickiness 2863
- Phospholipid hydrolysis in cod 3036
- Phosphorus, rice starch 2862
- Phytate, cereals 3090
- Polygalacturonase isoenzyme See enzymes
- Polyphosphate, chicken frankfurters, effect on *Clostridium botulinum* 3024
- Polyvinyl chloride film
 beef steak
 microbiological quality 3008
 organoleptic quality 3008
- Popcorn popping 2893
- Porcine carcass, pesticide residues 3011
- Pork
 cooked
 conventionally 3016
 microwave 3016
 mechanically deboned, tissue composition 3017
 quality 3018
 sausage milk powder supplemented 3019
 spoilage control by CO₂ 3020
- Potassium sorbate, *Clostridium botulinum* inhibition in bacon and ham 3021
- Potato
 composition effect of maleic hydrazide 2922
 irradiated, impedance 2924
 starch 2923
- Potato juice, protein separation 2925
- Poultry meat, keeping quality 3023
- Prawn spoilage by *vibrio* 3039
- Preservative effect on buttermilk quality 2988
- Processing effect on hamburger's protein 3012
- Propionibacterium application in food industry 2844
- Propoxur determination, LC 3082
- Propylene glycol alginate gel formation 2851
- Protease, cow's and goat's milk 2978
- Protein
 bovine 3010
 carbohydrate 2947
 cottonseed 2909
 hamburger's effect of heat processing 3012

Protein (contd.)

- potato, effect of maleic hydrazide 2922
- potato juice 2925
- shrimp waste 3040
- Proteolytic enzyme, cheese 2992
- Psophocarpus tetragonolobus* See winged bean
- Quality control, cost benefit analysis 2970
- Ragi flour hydration 2858
- Ragi starch hydration 2858
- Random errors in analytical methods 2828
- Rapeseed processing practice 2907
- Rasagolla microbiological quality 2987
- Rastrelliger kanagurta* See mackerel
- Refrigeration
 - cheese 2991
 - vegetables 2818
- Rheology of food 3075
- Rice
 - breakage during milling 2861
 - classification 2858
 - cooked, firmness, effect of phosphate 2863
 - starch
 - phosphorus and amylose 2862
 - stickiness and milling property 2800
- Rice bran and groundnut flour blend properties 2920
- Rice flour hydration 2858
- Robotics in food industry 2820
- Rye
 - protein 2875-6
 - starch
 - gelatinization 2871
 - granule size 2871
- Rye bread, baking test 2955
- Saccharide in maize syrup, determination, HPLC 2890
- Saccharomyces* See yeast
- Salmonella*
 - beef effect of temperature 3007
 - biochemical characterization and serological confirmation 3106
 - food, detection, DNA-DNA hybridization 3105
 - in milk, detection
 - by Felix-01 bacteriophage 2982
 - by HPLC 2981
- Sauce rheology 3075
- Sausage, Italian, organoleptic property 3028
- Scarlet gourd 2934
- Seafood
 - bacteriological quality 3029
 - Vibrio parahaemolyticus*
 - enumeration 3030
 - isolation 3031
- Serum cholesterol effect of protein 3084
- Sesame seed processing practice 2907
- Shark
 - liver oil 3034
 - marketing 3034
 - processing 3034
- Shellfish, *Vibrio cholerae* 3038
- Shrimp waste protein extraction 3040
- Single cell protein production 2840
- Sitophilus granarius* amylase 3079
- Sitophilus zeamais* amylase 3079
- Skim milk
 - calcium composition 2985
 - concentrate freezing 2984
- Slaughtering lamb 3014
- Soaking, winged bean 2906
- Sodium alginate, ice cream 2995
- Sorbic acid, *Clostridium botulinum* inhibition in bacon and ham 3021
- Sorghum
 - digestibility effect of decortication and extrusion 2898
 - molasses 2896
 - nutritional quality 2897
 - quality 2895
 - semolina hydration 2858
 - starch hydration 2858
- Sorghum bicolor* See sorghum
- Sorghum flour hydration 2858
- Soyabean
 - in North America 2910
 - processing practice 2907
- Soy protein, viscoelasticity and spinnability 2911
- Soy protein-palm oil water gel, microstructure 2912
- Soy sauce koji mould, production in plastic bag 2913
- Sphingolipid wheat 2872
- Spices dehydrated, microbiological quality 3068
- Spray drying paint 2819
- Squid, nitrogen loss during storage 3041
- Squid products, nitrosodimethylamine formation 3042

- Stabiliser, ice cream 2995
Staphylococcus isolation from catering establishment 3111
Staphylococcus aureus
 beef effect of temperature 3007
 milk and milk products 2987
 Starch
 potato's 2923
 lipid complex 2952
 wheat's, gelatinization 2870
 Stearic acid, vinyl monomer 3064
 Sterilization
 energy requirement 2814
 food by microwave heating 2813
 quality parameters 2814
 Storage
 apple 2945
 beef 3006
 disease of fruit 2935
Streptococcus
 inhibition in milk 2982-3
 Styrene migration from packing materials 3097
 Styrene monomer in food, determination 3096
 Sugar industry
 energy consumption 2951
 ion exchange technique 2950
 Sugar process technology 2948
 Sunflower seed oil composition 3056
 Sunflower seed processing practice 2907
 Sweet potato
 composition 2927
 peeling by CaCl_2 2926
Tagetes erecta oil, antifungal activity 3061
 Tallow, pentachlorophenol residues 3067
 Taro peeling by CaCl_2 2926
 Temperature
 beef
 effect on *Salmonella* 3007
 effect on *Staphylococcus aureus* 3007
 chicken
 effect on *Salmonella* 3007
 effect on *Staphylococcus aureus* 3007
 Tertiary butyl hydroquinone antioxidant 2846-7
 Texture, wheat 2869
 Thermostable enzyme production 2831
 Thiamine, food, determination, HPLC 3086
 Tissue composition, mechanically deboned pork 3017
 Tissue culture, food and nutritional application 2810
 Tocopherol
 food, determination 3089
 fluorimetry 3088
 Toluene, cereal, fat acidity 2855
 Tomato
 enzyme purification and characterization 2933
 freezing 2932
 Tomato ketchup rheology 3075
 Toxicity
 french bean lectin toxicity in *Callosobruchus maculatus* 2903
Tribolium castaneum control
 by fenitrothion 3081
 by malathion 3081
 Trichothecene sensitivity in human and mouse 3098
 Triglyceride oil polymer 3065
 Triticale
 milling and baking 2884
 milling tests 2884
 Turkey, Californian, processing plant, *Campylobacter jejuni* isolation 3026
 Turmeric, curcumin determination, HPLC 3069
 Vegetable oil sources 3054
 Vegetables
 dietary fibre determination 2958
 refrigeration 2818
 Vibrio, prawn spoilage 3039
Vibrio cholerae, shellfish 3038
Vigna unguiculata See cow pea
 Vinyl monomer from stearic acid 3064
 Vitamin A, wheat bran and growth of rats 2882
 Vitamin C stability in fruits and fruit products 2936
 Vitamin C, wheat bran and growth of rats 2882
Volvariella volvaceae See mushroom
 Weaning practice and infant feeding 3095
 Weighing of flour 2811
 Wheat
 Austrian
 processing 2865
 production 2865
 Canadian, quality, evaluation 2955

Wheat (contd.)

fat acidity 2858
 effect of insect infestation 2880
 genetical aspect of breeding 2874
 genetic evaluation 2864
 germination effect of insect
 infestation 2880
 glucan content 2873
 gluten, lysine modification 2878
 glutenin 2877
 insect infested, uric acid determi-
 nation, LC 2879
 microflora, effect of insect infes-
 tation 2880
 milled, microscopic structure 2867
 milling 2866
 mineral composition 2868
 protein 2875-6
 semolina hydration 2858
 sphingolipid 2872
 starch
 gelatinization 2870, 2 71
 granule size 2871

stored, *Cryptolestes ferrugineus*
 infestation 2881
 texture 2869
 uric acid determination, LC 2879

Wheat bran

ochratoxin A determination, HPLC
 2883
 vitamin availability and growth
 of rats 2882

Whey

spray drying
 effect of bacteria 2973
 effect of enzymes 2973

White bean, moisture composition 2905

Winged bean, blanching and soaking 2906

Yeast

genetic manipulation 2839
 production 2838

Yoghurt, whey based 2989

Zearalenol determination, TLC 3102

Zearalenone determination, TLC 3102

I N D E X

- A caloric fat like compound 3397
 Aflatoxin B₁
 neurotoxicity 3434
 olives, black 3274
 determination, TLC 3273
Agaricus bisporus See mushroom
 Agriculture
 energy 3148
 constraints 3118
 growth
 and instability 3113
 in Karnataka 3122
 in Madhya Pradesh 3120
 in Orissa 3123,3126
 in Punjab 3126-7
 in Southern India 3126
 in Tamil Nadu 3121
 in Western India 3119,3125
 Indian 3114-6
 production in Indian 3124
 Agro-food industries 3128
 Alcohol
 formation during whiskey
 fermentation 3385-6
 production, from fish tissue
 extract 3342
 Aluminium phosethyl, citrus disease
 control 3268
 Amaranth
 phytate 3253
 tannin 3253
 Amino acid
 determination, HPLC 3154
 metabolism in wheat 3189
 Antioxidants
 and cancer 3177
 determination, HPLC 3154
 Apple
 'Spartan' quality,
 effect of O₂ and CO₂ 3275
 Apple juice, patulin 3358
 Apple sauce, patulin 3358
 Aroma, coffee, determination, GC 3366
 Aseptic fermentation design 3161
 Asparagine metabolism in wheat 3189
 Asparagus, glyphosate residue, deter-
 mination, HPLC 3265
Aspergillus
 coffee 3371
 galacturonase activity and action
 3159
 Aspergillus flavus
 aflatoxin, effect of potassium sorbate
 3436
 growth, effect of potassium sorbate
 3436
 olives, black 3274
 Aspergillus niger, glucoamylase catalytic
 property 3158
 Aspergillus ochraceus, ochratoxin in
 barley 3211
 Aspergillus parasiticus
 aflatoxin effect of potassium sorbate
 3436
 growth effect of potassium sorbate 3436
 Atherogenicity, groundnut oil 3393
Atriplex hortensis leaf protein concent-
 rate 3285

Bacillus cereus, beef frozen stored 3325
Bacillus stearothermophilus protease pro-
 duction 3429
Bacillus subtilis proteolytic activity
 effect of disinfectant 3430
 Bacteriological quality, milk 3298
 Baked products
 nutritional-physiological evaluation
 3285
 effect of oil and fat 3285
 Baking, wheat-Canadian, effect on deoxy-
 nivalenol 3190
 Barley
 citrinin production 3211
 flavonoid polyphenol extract 3381
 malting quality and protein 3206-7
 mycotoxin 3210
 ochratoxin A production 3211
 protein
 and malting quality 3206,3207
 degradation 3205
 solubility 3206
 quinone producing penicillia 3210
 starch
 ethanol production 3208
 extrusion cooking 3208
 glucose syrup production 3208
 storage 3209
 varietal identification 3206
 varieties, malting quality effect of
 storage 3204
 Betanine in food 3180

b

- Beef
 effect of bleeding 3320
 effect of conditioning 3319
 effect of electrical stimulation 3319
 carcass
 characteristics 3327
 electrical stimulation 3327
 yield effect of trimming 3321
 fatty acid composition, determination, GLC 3322
 flaked, organoleptic property 3323
 formed, organoleptic property 3323
 frozen stored, microbiological quality 3325
 loaf, microbiological quality 3324
 muscle palatability 3327
Salmonella 3336
Versinia enterocolitica 3326
- Beer
 automated and gravity analyzer 3377
 cysteine determination, HPLC 3380
 EEC regulation 3378
 ethanol determination 3379
 production 3378
 quality 3378
 types 3378
- Benzoic acid as antioxidant in edible oil 3391
- Beverage industry, stainless steel use 3353
- Beverages
 oil based, carbonyl levels 3352
- Biodegradation, O-phenylphenol 3410
- Biotin in cereals 3187
- Blackberry
 glyphosate, determination, HPLC 3261
 sapanin 3260
- Bottle labelling 3356
- Brassica* glucosinolate 3392
- Bread 3287
 dough, gas retention 3288
 enrichment 3285
 packed, microbiological quality 3285
 quality and wheat gluten 3196
 recent development 3286
 rye's, aroma 328
 staling
 effect of grist 3289
 effect of monoglyceride 3290
- Breakfast cereals, biotin composition 3187
- Brewing 3376
 automated and gravity analyzer 3377
 20th Century 3375
- Broad bean
 polyphenol
 effect on growth of rat
 effect on intestinal sugar absorption by rat 3219
 effect on urinary 3-methyl histidine 3219
 protein 3220
- Brochothrix thermosphacta* growth 3371
- Butter
 blended with oleo-margarine, quality 3300
 margarine quality 3304
 fatty acid composition 3305
 hardness 3305
- Butylated hydroxyanisole, vegetable oil, determination, GC 3390
- Butylated hydroxytoluene
 and cancer 3177
 effect on liver 3178
 effect on neoplasm 3178
 vegetable oil, determination, GC 3390
- Cadmium, cocoa product 3374
- Caffeine
 hypercholesterolemic effect 3370
 research 3367
- Cake
 nutritive value 3292
 wheat flour property 3197
- Cancer and antioxidant 3177
- Cancerogenic hydrocarbon, cereals 3186
- Canola seed meal use 3394
- Captan, Californian strawberry 3264
- Carbamate
 metabolism 3412
 safety 3412
- Carbon dioxide
 apple 'Spartan'. quality 3275
 effect on *Clostridium botulinum* 3431
- Carbon tetrachloride, wheat fumigation 320
- Carotene, cassava variety 3250
- Carrot, organoleptic property effect of processing 3243
- Cartoon
 food packaging cartoon, microbial contamination
 effect of H_2O_2 3142
 effect of irradiation 3142
 hydrogen peroxide residue measurement 3143
- Cassava
 meal, fermented, nutritive value 3251
 starch, ethanol fermentation 3252
 variety, β -carotene 3250
- Catechol oxidase in green olive 3271-2
- Cedrus* oil fungitoxicant 3409

Cellulose, glucose formation 3279

Cereals

- cancerogenic hydrocarbon 3186
- ergot alkaloid determination, HPLC 3285
- loss 3188
- raw material for chemical industry 3285

Cheese

- 'Mahon' microbiological quality 3309
- technology 3308

Chicken

- curry 3338
- organoleptic property 3337
- tandoori 3338

Chloropicrin, wheat fumigation 3201

Cholesterol

- effect of dietary protein 3420
- effect of sodium phytate 3420

Citrinin, barley 3211

Citrinin production, *Penicillium citrinum* effect of antifungal compound 3176

Citrus

- aroma determination, GC 3267
- disease control by aluminium phosethyl 3268
- flavour determination, GC 3267
- fungus control by aluminium phosethyl 3268
- polymethoxyflavone determination 3266

Citrus juice

- limonoid metabolism 3361
- sugar composition 3360

Clam, microbiological quality 3349

Clostridium botulinum

- effect of CO₂ 3431
- effect of N₂ 3431
- effect of H₂ 3431
- meat-cured, inhibition by nisin 2329

Clostridium perfringens

- beef, frozen stored 3325
- enterotoxin 3432

Cocoa products

- cadmium composition 3374
- caffeine composition 3374
- lead composition 3374
- theobromine composition 3374

Cod

- Atlantic, pepsin 3346
- fillet storage 3345

Coffee

- aroma determination, GC 3366
- consumption 3362
- export specification 3363

Coffee (contd.)

- grading 3365
- Indian Standard 3363
- microbial spoilage 3368
- toxin formation 3368
- sieving requirement and garbling 3364
- storage structures, Indian standard 3369

Coffee bean

- ochratoxin 3372
- toxigenic fungi 3371
- viomellein 3372
- vioxanthin 3372
- xanthomegnin 3372

Colocynthis citrullus See melon

Colour

- synthetic 3181
- vitamin B₁₂ 3258

Comfrey products, vitamin B₁₂ 3258

Computer aided video system 3147

Confectionery coating 3284

Cookie

- protein enriched, extrusion cooking 3291

- potato, energy consumption 3247

Corynocapus laevigatus See karaka

Cottonseed

- fibre composition 3227
- protein composition 3227

Cow pea flour

- lipid
 - fatty acid composition 3221
 - oxidation 3221

Crabmeat, microbiological quality 3349

Cryptolestes wheat, stored, infestation 3199*Cryptolestes ferrugineus*

- effect of heat 3405
- effect of moisture 3405

Cyclopiazonic acid, mycotoxic *Aspergillus tamarii* 3435

Cysteine, beer, determination HPLC 3380

Daidzin, soyabean 323

Dairy products 3293

Deoxynivalenol, Canadian wheat, effect of milling and baking 3190

Digestion effect of nitrosamine 3150

Dihydroxychalcone as antioxidant in edible oil 3391

Dimethylamine toxicity 3426

Disaccharide

- uji flour
 - determination, GC 3280
 - fermentation 3280

d

Dough

- fermentation proteolytic activity 3285
- gas retention 3288
- property, extensograph 3285

Edible oils, phenolic acid as antioxidants 3391

Egg

- microbiological quality 3340
- tray, paper moulded 3339

Electrical stimulation, beef 3319

Energy

- consumption during potato cooking food and agriculture 3148
- cost, ionising treatment 3149

Enteritis necroticans incidence and sweet potato 3248Enterotoxin, *Clostridium perfringens* 3432

Environmental protection and food production 3285

Enzyme, immobilized 3157

Ephestia cautella

- effect of heat 3406
- wheat infestation fumigation by malathion 3202

Ergot alkaloid, cereals, determination, HPLC 3285

Escherichia coli enumeration 3427

Ester

- formation, whisky fermentation 3385-6
- passion fruit 3262

Ethanol

- beer, determination 3379
- cassava starch 3252
- production by fermentation 3162
- sweet potato, enzymatic hydrolysis 3249

Ethylene dibromide, wheat fumigation 3209

Explosion, puffing 3138

Extruder, twin-screw 3145

Extrusion cooking 3139

- cookie, protein enriched 3291

Fat consumption and daily food pattern 2421

Fats use in Great Britain 3388

Fatty acid

- butter 3305
- cowpea flour lipid 3221
- formation during whisky fermentation 3385-6
- mutton 3328
- passion fruit seed oil 3359

Fenugreek starch 3398

Fermented

- cassava meal nutritive meal 3251
- food 3163
- soyabean product, tempeh 3168

Fermentation

- aseptic design 3161
- ethanol production 3162
- locust bean 3 8

Fibre

- cottonseed meal 3227
- groundnut meal 3227
- soyabean meal 3227
- tomato seed meal 3227

Finfish radiation processing 3343

Firmness test, sorghum 3214

Fish

- pre-shipment inspection 3341
- quality control 3341

Fishery brine recycling 3344

Fish product

- pre-shipment inspection 3341
- quality control 3341
- radiation processing 3343

Fish tissue extract, alcohol production 3342

Flavour

- citrus, determination, GC 3267
- determination, HPLC 3154
- HPLC application 3155
- safety 3179

Flour lipoprotein 3285

Food industry, quality cost measurement 3136

Food store sanitation code 3438

French bean, phaseolin 3222

Fruit essence determination, GC 3267

Fruit juice 3355

- industry and pump development 3354
- market 3357
- patulin 3358

Fruit product, patulin 3358

Fungitoxicant, cedar oil 3409

Fumigation, stored rice, *Rhizopertha dominica* infestation control 3203

Galacturonase activity and action 3159

Genes, insecticide resistant 3411

Genistein, soyabean 3238

Genistin, soyabean 3238

Glass 3355

Glycoamylase catalytic property 3158

Glycosinolate, *Brassica* 3392

Glutamine metabolism in wheat 3189

Gluten

- protein carbohydrate complex 3184

- Gluten (contd.)
 - wheat
 - extraction 3195
 - effect of heat 3191
 - effect of starch gelatinization
- Glycinin, soyabean gelation 3233
- Glycoalkaloid, potato, effect of magnesium 3246
- Glyphosate residue
 - Asparagus*, determination, HPLC 3265
 - blackberry, determination, HPLC 3261
 - Kiwifruit, determination, HPLC 3265
- Grading coffee 3364-5
- Grain moisture determination 3403
- Green revolution and developing countries 127
- Groundnut
 - fibre composition 3227
 - protein composition 3227
- Groundnut oil
 - atherogenicity 3393
 - triacylglycerol 3393
- Growth of rat, effect of broad bean polyphenol 3219
- Hake muscle, trimethylamine N-oxide demethylase activity 3347
- Hazelnut composition 3242
- Heat
 - effect on
 - Ephestia cautella* 3406
 - larvae
 - lactose 3152
 - Oryzaephilus surinamensis* 3405
 - Rhyzopertha dominica* 3405
 - Sitophilus granarius* 3405
 - Tribolium castaneum* 3405
- Helianthus annuus* - See sunflower
- High performance liquid chromatography 3154
- Hog carcass characteristics 3331
- Hop
 - ethylene bis dithiocarbamate 3382
 - flavonoid polyphenol extract 338
 - storage 3383
- Horse mackerel, lipids 3348
- Horse radish, freeze dried, volatile 3399
- Hydrogen, effect on *Clostridium botulinum* 3431
- Hydrogen peroxide
 - effect on cartoon microbial contamination 3142
 - residues in cartoon 3143
- Immobilized enzyme 3157
- Infrared processing of soyabean 3231
- Insect infestation and pesticide 3407
- Insecticide
 - resistant gene 3411
 - safety 3412
- Intestinal sugar absorption
 - effect on broad bean polyphenol 3219
- Ionising treatment, energy cost 3149
- Irradiated, beef, microbiological quality 3324
- Irradiation
 - cartoon, effect on microbiological contamination 3142
 - mango 3269
- Karaka seed lipid composition 3395
- Kiwi fruit, glyphosate residue determination, HPLC 3269
- Lebelling of bottle 3356
- Lactobacillus* growth 3171
- Lactose, effect of heat 3152
- Lead, cocoa product 3374
- Leaf protein concentrate
 - Atriplex hortensis* 3255
 - lucerne
 - nutritive value 3254
 - polyphenolic compound determination 3254
- Lecithin, soyabean 3239
- Legume, protein 3216
- Limonoid metabolism, citrus juice 3361
- Linseed
 - fibre 3227
 - protein 3227
- Lipid
 - horse mackerel 3348
 - karaka seed 3395
 - rice miso, changes during fermentation 3164
 - sunflower meal 3396
- Lipoprotein effect of sodium phytate 3420
- Locust bean
 - fermentation 3218
 - processing 3218
- Lucerne
 - leaf protein concentrate
 - nutritive value 3254
 - polyphenolic compound determination 3254
- Lupine seed
 - protein 3212, 3224-6
 - concentrate 3226
 - nutritive value 3223
- Lupinus albus* See lupine

- Maize
 protein 3212
 stored, infestation
 by *Cryptolestes* 3199
 by *Oryzaephilus surinamensis* 3199
 by *Poldia interpunctella* 3199
 by *Rhyzopertha dominica* 3199
 by *Sitotroga cerealella* 3199
- Malathion, wheat, stored, fumigation 3202
- Malt
 diastatic power 3384
 microbial isolation during fermentation 3387
- Malting, barley variety effect of storage 3204
- Malus domestica* See apple
- Mango, effect of -irradiation 3269
- Market, fruit juice 3357
- Meat 3310
 amine determination 3313
 analysis by Warner-Bratzler device 3400
 cured
 antioxidative effect of nitrite 3317
 Clostridium botulinum inhibition by nisin 3329
 extract, creatinine determination 3314
 industry 3311
 marketing 3311
 morphometry by scanning electron microscopy 3316
 muscle protein, effect of cooking 3315
 palatability, effect of cooking 3315
 processing 3311
 quality and structure 3312
 regulation and policy 3311
 starter cultures use 3318
- Meat product, betanine 3180
- Melon seed protein, Nigerian 3277-8
- Methyl bromide, wheat fumigation 3201
- Methylene dichloride, wheat fumigation 3201
- Methylhistidine, effect of broad bean polyphenol 3219
- Microbiological contamination
 cartoon
 effect of H_2O_2 3142
 effect of irradiation 3142
- Microbiological quality
 bread-packed 3285
 clam 3349
- Microbiological quality
 coffee 3368
 crabmeat 3349
 egg 3340
 oyster 3349
 veal 3332
- Microbial pesticide, safety 3408
- Milk
 aflatoxin M_1 determination 3299
 bacteriological quality 3298
 goat's, ester's determination 3301
 human
 lactoferrin
 effect of processing 3302
 effect of storage 3302
 lipolytic activity 3303
 nonfat dry, nutritional and gastrointestinal response 3297
 quality 3296
 solanidine determination GC 3300
- UHT
 bitterness 329
 proteolysis 3294
 viscosity 3294
 volatile compounds
 effect of process 3295
 effect of storage 3295
 effect of temperature 3295
- Milk products
 aflatoxin M_1 determination 3299
 betanine 3180
- Milling, Canadian wheat, effect on deoxynivalenol 3190
- Miso
 rice
 carboxylic acid composition 3165
 fermentation, lipid changes 3164
 protein 3166-7
- Monoglyceride, effect on bread staling 3290
- Monosaccharide
 Uji flour
 determination, GC 3280
 fermentation 3280
- Mushroom
 lignin degradation 3173
 N^2 -($-L$ -(+)-glutamyl)-4-carboxyphenyl hydrazine synthesis 3172
- Mustard protein, phytate binding 3228
- Mutton, fatty acid 3328
- Mycotoxin
 cyclopiazonic acid, *Aspergillus tamarii* 3435
- Mycotoxin barley 3210
- Naringin radioimmunoassay 3156

- Nisin *Clostridium botulinum* inhibition in cured meat
 Nitrite
 antioxidative, effect on cured meat 3317
 toxicity 3426
 Nitrogen
 effect on *Clostridium botulinum* 34 1
 solanum nigrum nutritive value 3259
 Nitrosamine, effect on digestion 3150
 formation, effect of sodium chondroitin 3151
 Nutrition 3418

 Oat meal, biotin 31 7
 Oats, biotin 3187
 Ochratoxin
 coffee 3368
 coffee bean 3372
 Ochratoxin A
 barley 3211
 olives, black, determination, TLC 3273
 Odour compounds
 thiamine photolysis 3415
 Ogi production, sorghum based 3215
 Oils, use in Great Britain 3388
 Oilseed based beverage, carbonyl level 3352
 Olive
 black
 aflatoxin 3274
 aflatoxin B₁, determination, TLC 3273
 ochratoxin A determination, TLC 3273
 green, catechol oxidase 3271
 Organoleptic evaluation, paired difference test 3401
 Organoleptic property
 carrot, effect of processing 3243
 chicken 3337
 tomato 3257
 Organothiophosphate, determination, HPLC
 photolysis and electrochemical 3413
Oryzaephilus surinamensis
 effect of heat 3405
 effect of moisture 3405
 wheat, stored, infestation 3199
 Oxidation, cow pea flour lipid 3221
 Oyster, microbiological quality 3349
 Packaging, environment interaction 3140
 Palm sago 3283
 Papaya ripening measurement 3276
 paper moulded egg tray 3339
Passiflora edulis See passion fruit
 Passion fruit seed oil
 fatty acid 3359
 purple, ester 3262
 yellow, ester 3262
 Patulin
 apple juice 3358
 apple sauce 3358
 fruit juices and fruit products 3358
 Pea
 microbiological quality 3324
 protein
 organoleptic property 3217
 water retention 3217
 Pectic substances, radish root, effect of Ca salt 3245
Penicillium classification based on mycotoxin 3437
Penicillium citrinum, effect of anti-fungal compound 3176
Penicillium digitatum citrus, control by aluminium phosethyl 3268
Penicillium viridicatum citrinin in barley 3211
 Pepsin/Atlantic cod 3346
 Personnel training in quality control 3134
 Pesticide 3407
 microbial, safety 3408
 Pest in stored product 3404
 Phaseolin, french bean 3222
 Phenolic acid
 as antioxidant in edible oil 3391
 soyabean protein, determination, HPLC 3236
 Phenylacetic acid as antioxidant in edible oil 3391
 Phenylphenol biodegradation 3410
 Phenylpropionic acid as antioxidant in edible oil 3391
 Phosphorus, soyabean protein 3237
 Phytate
 amaranth 3253
 mustard protein 3228
 soyabean protein 3237
 Phytic acid application 3389
Phytophthora parasitica citrus disease, control by aluminium phosethyl 3268
 Pig slaughter 3330
Pleurotusajor-caju See mushroom

Plodia interpunctella
 wheat infestation 3199
 fumigation by malathion 3202
 Plum, saponin 3260

h

Polymethoxyflavone, citrus, determination, MS 3266

Potassium sorbate

effect on *Aspergillus*
aflatoxin production 3436
growth 3436

Potato

cooking, energy consumption 3247
glycoalkaloid, effect of magnesium 3246

microbiological quality 3324

Poultry meat quality 3334

Poultry product

comminuted 3338
campylobacter jejuni 3335
Salmonella 3336

Poultry production 3333

Processing, milk, effect on lactoferin 3302

Protease, *Bacillus stearothermophilus* 3429

Protein

effect on cholesterol and lipoprotein 3420

cottonseed 3227

digestibility index 3416

groundnut meal 3227

legume

linseed meal 3227

lupine seed 3212, 3224-6

nutritive value 3223

maize 3212

nutritive value 3417

rice miso 3166-7

soyabean, water absorption 3235

soyabean meal 3227

sunflower seed 3241

tomato seed meal 3227

zein, isoelectric focussing in
agarose 3213

Proteolytic activity

Bacillus subtilis effect of disinfectant 3430

Prune, stored, sorbic acid determination 3220

Puffing 3138

Quality and plant management 3132

Quality control

cost 3135

operational procedure 3133

personnel training 3134

principles 3133

sanitation 3133

Quality cost measurement, food industry 3136

Radiation, fishery product 3343

Radioimmunoassay narigin 3156

Radishroot, pectic substance, effect of
Ca salt 3245

Rapeseed

protein

concentrate 3230

nutritive value 3229

Raspberry brandy, characterization GC 3263

Raw material suppliers and users 3137

Research and development policy 3129-30
industrial 3130

Rhyzopertha dominica

effect of heat 3405

effect of moisture 3405

rice, stored infestation control by
fumigation 3203

wheat, stored, infestation 3199

Ripening, papaya 32 6

Rice

miso, carboxylic acid 3165

protein 3166-7

stored, infestation control by fumiga-
tion 3203

Rye bread aroma 3285

Saccharide

uji flour

determination, GC 3280

fermentation 3280

Saccharin toxicity 3182

Safety, flour 3179

Sago, palm 3283

Salmonella, meat and poultry 3336

Sanitation code for food store 3438

Saponin, fruits 3260

Sausage, effect of yeast 3175

Selenium

anticarcinogen 3422

mutagenicity 3423

and tumor 3424

vitamin E 3425

Shellfish, radiation processing 3343

Shrimp, filth distribution 3350

Sitophilus granarius

effect of heat 3405

effect of moisture 3405

Sitotroga cerealella

rice, stored, infestation control by
fumigation 3203

wheat, stored, infestation 3199

Sodium nitrite toxicity 3 26

Sodium phytate

effect on cholesterol 3420

effect on lipoprotein 3420

Solanum nigrum

nutritive value

effect of N₂ 3259

effect of storage temperature 3259

Solar device 3146

Sorbic acid in stored prunes, determination 3270

Sorghum

firmness test 3 14

milling for ogi production 3215

Soyabean

daidzin 3238

genistein 3238

genistin 3238

glycinin

gelation 3233

fibre 3227

lecithin emulsification 3239

processing, infrared 3231

Soyabean leaves, cyclitol 3232

Soy protein 3226

composition 3217, 3227

concentrate 3226

flavonoid determination, HPLC 3236

organoleptic property 3217

phenolic acid determination, HPLC 3236

phosphorus 3237

phytate 3237

precipitation 3234

water retention 3217

Spice, HPLC application 3155

Sponge cake, nutritive value 3292

Stainless steel use, beverage industry 3353

Staphylococcal enterotoxin determination 3433

Starch

barley's

ethanol production 3208

extrusion cooking 3208

glucose syrup production 3208

digestibility 3282

fenugreek 3398

wheat, gelatinization, effect of gluten 3193

Sterol oxides 3419

Storage

barley variety malting quality 3204

cod fillet 3345

milk effect on lactoferrin 3302

milk-UHT, effect on volatile compound 3295

temperature, *solanum nigrum* nutritive

• value 3259

Storage shed, pressure distribution 3402

Storage structures for coffee bean, Indian Standard 3369

Stored

product research 3404

wheat infestation

by *Cryptolestes* 3199by *Oryzaephilus surinamensis* 3199by *Poldia interpunctella* 3199by *Rhyzopertha dominica* 3199by *Sitotroga cerealella* 3199

Strawberry

Californian, captan treated 3264

saponin 3260

Sucrose ester, food application 3281

Sugar

citrus juice 3360

determination, HPLC 3154

Sulphite in food 3153

Sunflower oil, lipid 3396

Sunflower seed

protein 3241

concentrate 3230

volatile component 3240

Sweet potato

Enteritis necroticans incidence 3248

enzymatic hydrolysis and ethanol production 3249

Symphytum See comfrey

Tannin, amaranth 3253

Tea, bottled 3373

Tempeh

fermented soyabean product 3168

vitamin 3169

Teritary butyl hydroxyquinone: vegetable oil, determination, GC 3390

Theaflavin 3351

Theobromine product

cocoa product 3374

Thiamine photolysis

odour compound 3415

Tofuyo manufacture, koji 3170

Tomato

microbiological quality 3256

organoleptic property 3257

Tomato seed

fibre 3227

protein 3227

Toxicity

dimethylamine 3426

nitrite 3426

Triacylglycerol

groundnut oil 3393

Tribolium castaneum

effect of heat 3405

effect of moisture 3405

- Trimethylamine, N-oxide demethylase activity, hake muscle 3347
- Trisaccharide
uji flour
determination, GC 3280
fermentation 3280
- Tumor and selenium 3424
- Uji flour
saccharide determination, GC 3280
- Veal, microbiological quality 3332
- Vegetable oil
additive determination, GC 3390
- Vicia faba* See broad bean
- Vigna unguiculata* See cow pea
- Viomellein, coffee bean 3372
- Vioxanthin, coffee bean 3372
- Virus, transmission by food 3439
- Vitamin
determination, HPLC 3154
tempeh 3169
- Vitamin E and selenium 3425
- Vomitoxin See deoxynivalenol
- Water activity measurement 3285
- Wheat
asparagine metabolism 3189
Canadian
deoxynivalenol effect of milling and baking 3190
dough quality and sulphur 3192
fumigant distribution 3201
fumigation by malathion 3202
germ, biotin 3187
glutamine metabolism 3189
gluten
effect of heat 3191
extraction 3195
quality, bread improvement 3196
infestation, effect on quality 3200
quality
effect of insect infestation 3200 and sulphur 3192
starch gelatinization effect of gluten 3193
starch-gluten, DSC 3193-4
stored
fumigation by malathion 3202
infestation
by *cryptolestes* 3199
by *Oryzaephilus surinamensis* 3199
by *Plodia interpunctella* 3199
by *Rhyzopertha dominica* 3199
by *Sitotroger caralella* 3199
- Wheat bran, biotin 3187
- Wheat flour
chlorinated, properties 3197
quality and sulphur 3192
- Whey
nutritive value 3306
protein concentrate gel 3307
- Whiskey
fermentation alcohol 3385-6
ester 3385-6
fatty acid 3385-6
microbial isolation during fermentation 3387
- Xanthomegnin, coffee bean 3372
- Xylanase production, streptomyces culture cultivation 3160
- Yeast
characteristics 3174
effect on sausage 3175
- Versinia*, food 3428
- Versinia enterocolitica* beef stew 3326
- Zein, isoelectric focusing in agarose 3203
- Zeleny sedimentation test, effect of disulphide-cleaving agent 3185

- Betalain deodourization in horseradish 3688
 Beverages carcinogenicity 3647
 Biomass production in apple juice
 effect of preservatives 3657
 Bitterness of beer 3667
 Blood
 broiler's composition 3624
 globin 3597
 Bologna
 spoilage effect of phosphate and glucose 3616
 Bovine
 carcass, electrical stimulation 3603
 muscle
 glycogen degradation 3604
 lactate dehydrogenase activity 3604
 protein 3605
 Bread
 composition 3572
 starch and fungal amylase use 3573
 Broiler
 blood composition 3624
 breast meat 3626
 meat 3625
 offal 3624
 Brominated oil residues and toxicity 3716
 Buckwheat protein quality 3491
Byssoschlamys nivea, biomass and patulin production in apple juice, effect of preservative 3657
 Cadmium intake 3703
Cajanus cajan See pigeon pea
 Cake effect of emulsifier 3575
 Cake doughnut, effect of legume protein flour 3576
Callosobruchus infestation of cow pea 3509
 Cancerogenic polycyclic aromatic hydrocarbon 3713
 Canola oil, automated AOM test 3674
 Cans based on aluminium and polyethylene 3443
 Carcass
 cattle's
 weight 3601
 yield 3602
 Carcinogenicity, non-alcoholic beverage 3647
 Carotenoid, tea 3660
 Carp meat rheology 3642
 Cashew apple juice storage 3561
 Cassava flour 3536
 Cattle
 carcass
 weight 3601
 yield 3602
 Celery
 composition 3541
 products, aroma 3542
 Cellulase production 3451
Ceratocystis paradoxa soft rot pathogen of pineapple 3562
 Cheese microstructure and properties 3584
 Chicken muscle nucleotide 3623
 Chilled beer cloudiness removal 3602
 Chlorine dioxide effect on microorganisms in cucumber 3546
 Chlorophyll, tea 3660
 Chocolate 3566
 cocoa butter determination 3567
 Clarification of fruit juice by ultra-filtration 3649
Clostridium sporogenes growth in frankfurter, effect of sodium chloride 3617
 Cloudiness removal in beer 3662
 Coagulation, sheep's milk 3579
 Cocoa butter
 in chocolate 3567
 in confectionery 3567-8
 Coffee
 aluminium composition brewed in aluminium percolator 3659
 aroma determination, GC 3658
 surrogate standards 3472
 Cola turpentine like off-odour 2537
Colocynthis citrullus See melon
 Colour
 grape juice effect of temperature 3654
 stability
 in apple juice 3656
 pear juice 3656
 Colourant, neopurpuration 3466
 Computer application in industry 3445
 Condiments use by urban and rural families 3687
 Confectionery fat 3568
 Cookie, organoleptic property, effect of milk protein 3574
 Cooking quality of pigeon pea 3510
 Copper intake 3703
 Coumarin formation during drying 3536
 Cow pea infestation by *Callosobruchus* 3509
 Creatine phosphate, beef muscle 3598
 Creatine phosphokinase activity, beef muscle 3598
 Crowberry anthocyanin 3549
 Crystallization process in sugar refinery 3559

Cucumber, effect of chlorine dioxide
on microorganisms 3546
Curcuma dyes determination 3465
Cynarin in artichoke 3538
Cytochalasin, mass spectrometry 3722

Date seed, nutritional value 3547
Date wine microbiology 3661
Dehydrated potato comminution 3532

Dietary
fiber, puffed and shredded wheat
3487

ingredient effect of lamb meat
flavour 3608

protein, 3696

Digestibility protein 3697

Dipodascus magnusii See yeast

Dough

stability

effect of additives 3571

effect of flour 3571

effect of yeast 3570-71

Drying

artichoke 3539

coumarin formation 3536

Dyes, curcuma, determination 3465

Egg

hatchability 3628

lipid 3630

protein 3629

Electrical stimulation of bovine
carcass 3603

Empetrum nigrum See crowberry

Emulsifiers

effect on cake 3575

effect on starch 3564

Emulsifying property of meat protein
3593

Energy savings during milk homogeni-
zation 3578

Enterotoxigenic staphylococci in
food 3720

Enzyme

inhibitor effect on pancreatic
proteinase 3503

starch saccharification 3562

Ester migration into fruit 3550

Ethanol

in beer 3666

determination by oxidase electrode
in flow injection system 3455

fermentation system effect of air
supplement 3456

from whey 3583

Extruder

twin-screw-HTST extruder for enzyma-
tic conversion of starch 3563

wheat starch degradation 3482

Extrusion 3442

kidney bean 3507

Fat

broiler meat 3625

for confectionery 3568

metabolism and alcohol consumption 3708

stability, automated AOM test 3674

Fermented

fish, *pediococcus* 3458

maize meal, vitamin B 3501

meat, *pediococcus* 3458

vegetable, *pediococcus* 3458

Firmness of cooked rice, effect of
phosphate 3475

Fish

amine toxicity determination, HPLC
3631

methionine determination, GLC 3632
muscle

discoloration 3636

freshness 3636

species identification 3635

Fisheries, Andhra Pradesh 3634

Flavour

Allium grayi 3529

biosynthesis 3460

concentrate of mushroom 3461

soyabean oil packed in PVC 3683

yeast 3462

Fluoroacetic acid in guar gum 3467

Food

extrusion 3442

microbial poisoning 3718

mold detection 3721

preservation 3441

selenium 3702

sensitivity 3705

thiocyanate determination, GC 3446

Frankfurter

Clostridium sporogenes growth

effect of sodium chloride 3617

protein substitutes 3619

Staphylococcus aureus growth, effect of
sodium chloride 3617

water uptake and cooking loss 3618

Frozen dough stability effect of yeast
3570-71

Fruit juice

clarification by ultrafiltration 3649

pasteurization 3647

plant 3650

- Fruit puree, mold detection 3721
 Fungal amylase in breadmaking 3573
 Fungi, mercury biotransformation 3712
 Fungicide, synthesis and properties 3693

 Glucosidase in milk 3580
 Garlic acid inhibitory effect on *B. subtilis* 3464
 Gel test for parboiled rice 3476
 Gibberellic acid effect on barley 3493
 Gliadin protein modification 3470
 Glucoamylase adsorption 3452
 Glucose effect on bologna keeping quality 3616
 Gluten methyl ester, viscoelastic property 3488
 Glycogen
 degradation in bovine muscle 3604
 starch folacin assay 3699
 Glycosyl sucrose effect on pectin jelly gel formation 3469
 Grape juice
 colour effect of temperature 3654
 tartarate stability 3655
 yeast growth measurement 3654
 Groundnut oil
 differentiation 3676
 pyrolysis 3677
 Guar gum, fluoroacetic acid 3467

 Heat effect on muscle protein 3594
Helianthus annuus See sunflower seed
Helianthus tuberosus See artichoke
 Homogenization of milk, energy savings 3578
 Hop oil inhibitory effect on *B. subtilis* 3464
 Horseradish, betalain decolourization 3688
 Hydrogen peroxide effect on horseradish betalain decolourization 3688
 Hydrophobicity of meat protein 3593
 2-hydroxyalkyl-n-nitrosothiazolidine mutagenicity 3712
 Hygiene, meat 3596
 Hypoxanthine in chicken muscle 3623

 Icecream scoop cleaning 3585
Ichida kaki See persimmon
 Inosine in chicken muscle 3623
 Iron
 in meat 3587
 intake 3703
 in soy/meat 3520

 Irradiated kamaboko, amino acid 3644
 Jojoba oil 3678

 Kamaboko irradiated, amino acid 3644
 Keeping quality
 beer 3663
 bologna effect of glucose and phosphate 3616
 Kidney bean, air classification and extrusion 3507
 Kiwi starch 3551
 Krill protein 3641

 Lactate dehydrogenase in bovine muscle 3604
Lactobacillus bulgaricus antimicrobial activity in milk 3581
Lactobacillus plantarum, fermented sausage 3615
 Lactones, *polyporus durus* 3460
 Lamb meat flavour
 effect of ingredients 3608
 effect of sex 3603
 effect of weight 3603
 Lead
 intake 3703
 leafy vegetable 3540
 Leafy vegetables, lead composition 3540
 Legume flour, minerals and phytic acid 3504
 Lipids
 egg 3630
 effect on maize starch gel 3498
 oxidation 3637
 in meat 3587
 Lipoperoxidation effect on aflatoxin 3724
 Lysozyme, amino acid 3698

 Macaroni, maize-germ enriched 3577
 Mackerel
 lipid oxidation 3637
 muscle amino acid 3638
 Maize
 aflatoxin 3499
 effect of propionic acid 3500
 amino acid 3496
 hardness 3495
 macaroni 3577
 meal
 aflatoxin effect of packaging 3502
 minerals 3523
 vitamin B 3507
 oil, automated AOM test 3674
 starch 3497-8
 Malondialdehyde determination in vegetable oil 3675

- Malt
 - quality determination 3669
 - steeping 3669
- Malting of barley 3670
- Manganese intake 3703
- Margarine 3686
- Market survey of apple and potato 3556
- Meat
 - B. subtilis* recovery 3600
 - cooked
 - iron composition 3567
 - lipid oxidation 3587
 - hygiene 3596
 - melanoidine 3590-91
 - microbiological quality 3596, 3600
 - phosphate use 3595
 - volatile effect of water activity 3589
- Meat products
 - melaniodine 3592
 - nitrosamine 3613
 - plasma use 3611
- Meat protein
 - emulsifying property 3593
 - hydrophobicity and solubility 3593
 - muscle, effect of heat 3594
- Melanoidine in meat 3590-92
- Melonseed flour, processing effect 3557
- Mercury, biotransformation by fungi 3712
- Metabolism and nutrition 3707
- Methionine in fish 3632
- Microbial food poisoning 3718
- Microbial contamination
 - control
 - food 3448
 - pork 3610
- Microbial quality of meat 3596
- Microbiology, data wine 3661
- Milk
 - aflatoxin M₁ 3582
 - antimicrobial activity of *L. bulgaricus* 3581
 - galactosidase 3580
 - homogenization and energy savings 3578
 - sheep's coagulation 3579
- Milk powder, aflatoxin 3582
- Milk protein
 - in baked products 3569
 - in cookie effect on property 3574
- Milling
 - quality of rice and topography 3473
- Mineral
 - krill 3641
 - legume 3504-3521
 - maize meal 3523
 - mungbean 3521
 - pigeon pea 3511
 - soyabean 3521
 - meal 3523
- Moisture, broiler meat 3625
- Monoglyceride 3685
- Mugil See mullet
- Mullet
 - keeping quality 3643
- Mungbean
 - mineral 3521
 - serine hydroxy transferase 3506
 - vitamin 3521
- Mushroom concentrate flavour component 3461
- Mutagenicity of 2-hydroxy-alkyl-N-nitrosothiazolidine 3712
- Mutton cured, polycyclic hydrocarbon and nitrosamine 3607
- Navy bean protein flour and cake dough nut 3576
- Neopurpuration as food colour 3466
- Nitrosamine
 - meat products 3613
 - mutton 3607
 - pork 3609
- Nitrosothiazolidine in bacon 3612
- Nougat masses 3565
- Nucleotide in chicken muscle 3623
- Nutrient in broiler breast meat 3626
- Nutrition
 - adolescent and children 3706
 - in developing countries 3709
 - and metabolism 3707
 - mid day meal 3710
- Nutritional value of date seed 3547
- Offal, broilers, composition 3624
- Olive oil, automated AOM test 3674
- Organic wastes 3440
- Organochlorine pesticide residues in milk and blood of woman 3714
- Oyster, keeping quality 3646
- Packaging material
 - cans 3443
 - effect on maize meal aflatoxin production 3502
- Papain proteolytic activity in beer
- Passion fruit
 - by-products 3548
 - composition 3548

Pasteurization

fruit juice 3647

oyster keeping quality 3646

Patulin in apple juice, effect of preservatives 3657

Pea

quality and maturity 3512

zinc bioavailability 3508

Pear

processing equipment 3554

sucrose ester migration 3850

Pear juice colour stability 3656

Pearl millet, hardness 3495

Pectin jelly, effect of glycosyl sucrose 3469

Pectolytic enzyme production from agricultural waste 3450

Pedicococcus in fermented food 3458

Peeling

machine for fruits 3554

Persimmon, sugar composition 3558

Pesticide 3691

use in developing countries 3692

Pest management 3691

Phaseolus vulgaris See kidney bean

Phenolic compounds effect on horseradish betalain decolorization 3688

Phosphate

effect on bologna keeping quality 3616

effect on cooked rice firmness 3475

in meat, poultry and seafood 3595

Phospholipid, soyabean oil stability 3682

beef 3599

Photodegradation, riboflavin 3700

Phytic acid, legume 3504

Pigeon pea

cooking quality 3510

minerals and trace elements 3511

nutritive value 3511

Pineapple, *Ceratocystis paradoxa* soft rot pathogen 3552

Pollack

frozen reprocessing 3639

protein concentrate 3640

Polychlorinated biphenyl residues in body tissues 3715

in milk and blood of women 3714

Polycyclic aromatic hydrocarbons in smoke cured mutton 3607

Polyporus durus lactones 3460

Procine muscle protein 3605

Pork

microbial contamination 3610

nitrosamine formation 3609, 3613

Potassium sorbate, effect on apple juice

biomass production 3657

patulin production 3657

Potato

dehydrated, comminution 3532

market survey 3557

processing 3531

starch 3534-5

viscosity 3533

Poultry 3622

farm management 3620

in rural areas 3621

meat, phosphate use 3595

Preservation of food in rural areas 3441

Primrose seed oil 3679

Processing effect on melon seed flour 3557

Protein

broiler meat's 3625

buckwheat's 3491

concentrate of Alaska pollack 3640

development and evaluation 3694-5

dietary, quality and quantity 3696

digestibility 3697

gliadin 3470

sunflower seed's 3525

wheat's 3485

winged bean's 3513-4, 3516

Psophocarpus tetragonolobus See winged bean

Radish, storage by gas packaging system 3530

Rancidity prevention 3673

Rapeseed oil polymerization 3680

Rapeseed production 3517

Raspberry juice, amino acid 3652

Refrigeration and food production 3444

Rheology, carp meat 3642

Rhizonin A, *Rhizopus microsporus* 3726*Rhizopus microsporus*, rhizonin A

toxicity 3726

Rhodamine synthesis and fungicidal property 3693

Riboflavin photodegradation 3700

Ribonuclease, amino acid effect of water 3698

Rice

bran oil 3479

stabilizer 3478

cooked, firmness effect of phosphate 3475

milled, dimension 3474

new standards 3472

parboiled, texture, gel test 3476

Rice (contd.)

starch 3477

topography and milling quality
3473Rye meal, grinding and baking tech-
nique 3480

Saccharide, burnt sugar 3560

Saccharification of starch enzyme
application 3562

Salinity effect on shrimp 3645

Salt

in food 3704

taste fibers 3690

Sausage

L. plantarum activity 3516

soy extended 3614

Scomber japonicus See mackerel

Seafood 3633

amine toxicity 3631

phosphate use 3595

Selenium in food 3702

Sensory evaluation of food service
system 3689Sex, effect on cooked lamb meat
flavour 3608Shrimp, amino acid effect of salinity
3645

Single cell protein production 3463

Slaughter weight effect on lamb meat
flavour 3608Sodium benzoate effect on apple juice
biomass production 3657

patulin production 3657

Sodium chloride effect on microorgani-
sms in frankfurters 3617

Sorghum hardness 3495

Soups, instant, New standards 3472

Soyabean

flake protein 3524

meal, minerals 3527, 3523

packed in PVC, flavour and stability
3683

vitamin 3521

Soyabean oil

nonfood uses 3681

stability 3682

Soy extended sausage 3614

Soy/meat products, iron bioavailability
3520

Soy protein

effect on starch gelatinization
3519

spunfiber strength 3518

Spices

standards 3472

use in urban and rural areas 3667

Stabiliser for rice bran 3478

Staphylococcal enterotoxin in food 3720

Staphylococcus aureus growtheffect of sodium chloride in frank-
furters 3617

Starch

adzuki bean 3505

bread 3573

effect of emulsifiers 3564

effect on maize starch gels 3498

enzymatic conversion 3563

gelatinization effect of soy protein
3519

glycogen, folacin assay 3699

maize 3497

potato 3534-5

retrogradation, effect of soy protein
3519

rice 3477

saccharification 3562

wheat's, degradation 3482

wheat's flour, oil binding capacity
3484, 3489-90

Steeping, malt 3669

Storage

cashew apple juice 3651

effect on maize meal aflatoxin 3502

radish, gas packaging system 3530

Strawberry juice amino acid 3652

Sugar

effect on maize starch gel 3498

industry, waste water treatment 3561

persimmon 3558

refinery crystallization process 3559

saccharide composition 3560

Sulphur dioxide, effect on apple juice

biomass production 3657

patulin production 3657

Sunflower seed

oil and water determination 3684

protein 3525

Sunflower oil 3684

automated AOM test 3674

polymerization 3680

Syrup, tapioca waste 3527

Tapioca waste, syrup 3527

Tartarate stability in grape juice 3655

Tea

chlorophyll and carotenoid 3660

Tempeh 3457

Temperature effect on grape juice colour 3654

Texture

cookie, milk protein effect 3574
parboiled rice, gel test 3476

Therogra chalcogramma See pollack
Thiocyanate determination in food 3446

Tocopherol, soyabean oil stability 3682

Tofu 3457

Tomato juice 3543

pH elevation by *B.coagulans* 3544
preservation 3545

Tomato puree, mold detection 3721

Topography of rice and milling quality 3473

Toxicity

brominated oil residues 3716
trichothecene 3725

Trace elements, pigeon pea 3511

Trialkoxyglyceryl ether 3678

Trialkoxycitrate 3678

Trialkoxytricerballylate 3678

Trichothecene toxicological effect 3725

Turkey meat 3627

Turpentine like odour; cola 3527

Ultrafiltration, clarification of fruit juice 3649

Vegetable oil

malonidialdehyde 3675

Vegetable seed extraction, mechanical device 3528

Vigna angularis See adzuki bean

Vigna radiata See mung bean

Viscosity, potato starch 3533

Vitamin B, fermented maize meal

Vitamin

mung bean 3521

soyabean 3521

wheat bran 3486

Waste

agricultural, pectolytic enzyme production 3450

organic 3440

water treatment in sugar industry 3561

Water activity

determination 3447

effect on meat volatiles 3589

Wheat

bran, vitamin 3486

kernel, amylase activity 3483

meal, grinding and baking technique 3480

mineral 3481

oil binding ability 3484

protein 3485

puffed and shredded effect of dietary fiber 3487

starch, degradation 3482

Whey, ethanol production 3583

Wine, date's, microbiology 3661

Winged bean

flour property 3515

oil 3516

protein 3513-4, 3516

Yeast

differentiation 3453

flavour production 3462

frozen dough stability 3570

growth measurement in grape juice 3653

Zinc

intake 3703

pea 3508

Carbaryl residues in pineapple 3844

Cassava flour

amylose 3829

roasting effect 3829

texture 3829

Cattle carcass weight 3906

Cereals

demand and supply in Haryana 3736

dietary fibre 4016

Cherry ripeness measurement 3854

Chicken

fatty acid 3916

methoxychlor 3915

Chick pea

composition 37 8-9

nutritional value 3798

oligosaccharide composition 3798-9

Chili, nitrite treated, mutagen

formation 4001

Chlorophyll in edible oil 3976

Chocolate

and cariogenicity 3868

and coating usage 3869

masses 3867

masses, tempering procedure 3867

processing by Wiener system 3866

wiener system for processing 3866

Chrysichthys nigrodigitatus fat and quality 3923

Citharinus citharus and quality 3923

Citrus waste for single cell protein production 3766

Clarias lazera

composition 3933

nutritive and organoleptic changes 3932

Clove oil

Callosobruchus control 3796

hydrocarbon 3981

Coconut oil

decolourization 3978, 3982

Coconut shell extract *Callosobruchus* control 3796

Cocos nucifera See coconut

Cod, mineral composition 3924

Coffee

biosynthesis and biodegradation of alkaloid 3965

classification 3964

physiological and pathological effect 3966

Colour 4006

canned mushroom 3767

Computer recording of pathological data 4026

Confectionery

application of starch 3864

raw material 3865

quality control and specification 3865

Conglycinin in soyabean 3810

Conophor seed protein 3805

Copra grating 3975

Cottonseed

gossypol

analysis 3834

toxicity 3806

Cow pea, effect of processing 3800

Crassostrea madrasensis See oyster

Cyclohexyl isocyanate 4043

Dairy products, polycyclic aromatic

hydrocarbon residue 4048

Dairy starter culture technology 3879

Date, dried product - tamar eddin 3842

Dehydration and fruit cuticle wax 3839

Dehydroascorbic acid in fruit and vegetables 3841

Diet 4019

Dietary fibre - bibliography 4017

Dietary fibre in food 4016

Dietetic beer 3973

Dill, aroma composition 4005

Dimethyl fumarate mold inhibition in tortilla 3878

Diphenylamine residues in apple 3858

DNA cloning 3732

Dodonaea oil, *Callosobruchus* control 3796

Dodonaea viscosa See *dodonaea*

Dover sole, mineral composition 3924

Dried data product - tamar eddin 3842

Dryer

energy consumption 3745

effect of design, control and climate 3745

Drying

mussel meat 3946

rice 3776

Duck sausage quality 3918

Eel muscle, lysosomes 3940

Effluent treatment 3975

Egg

composition of white leghorn 3917

production 3919

Egg products, liquid, composition 3512

Egg protein gelation 3920

Electrical stimulation and bacterial survival in meat 3893

Endive, vitamin 3831

- Energy
 biomass 3747
 consumption and flour mill
 automation 3743
 savings in food industry 3746
- Esters in wine 3971
- Ethanol
 from glucose 3770
 production by yeast 3771
 production by *Zymomonas mobilis*
 3759
- Ethylbromophos mutagenicity 4046
- Ethylene fungicidal and molluscidal
 activity 4011
- Ethylene - plant hormone 3731
- Ethylcosapentaenoate in sardine
 oil 3937
- Euterpe edulis* See palm
- Extrusion cooking of wheat flour and
 starch 3783
- Faba bean toxicity 4037
- Fat, human consumption 3989
- Fatty acid
 in *Acorus calamus* 3990
 chicken 3916
 composition of seed 3978
 determination 3991
 rice bran 3978
 separation 3978
- Favism 4037
- Fermentation
 ethanol production by *Zymomonas*
mobilis 3759
 grape juice 3957
 meat 3899
- Fermented soyabean product, nutrition-
 al quality 3761
- Fish
 fungus control 3922
 intermediate moistured, muscle
 fat and quality 3923
 minerals in muscle tissue 3924
 nitrogen determination 3926
 polycyclic aromatic hydrocarbon 3925
 protein 3927
 stored, fungus control 3922
 trimethylamine oxide 3934
 washing out process and ultrasonics
 3931
- Fish products
 quality 3935
 storage 3936
- Flavour 4006
 grapefruit juice 3960
 orange juice 3960
- Flavour (contd.)
 rye bread 3877
- Flour
 aflatoxin 4035
 mycoflora 4032
Penicillium and *Aspergillus* in 4033
 Flouride in sherry wine 3974
 Flour mill, automation and energy con-
 sumption 3743
- Folic acid in wheat 3786
- Food
 acquisition and woman 3930
 composition tables 3751
 oxalic acid composition 3753
 resources 3727
- Food industry and energy savings 3746
- Food products in 1980's
- Fractionation unit 3744
- Fructose, cariogenicity 3868
- Fruit
 dehydration and cuticle wax 3839
 dehydroascorbic acid level 3841
 processed 3842
- Fruit production statistics 3838
- Fruit juice *Byssoschlamys* in 3953
- Fruit juice industry, raw materials
 3953
- Fruit processing industry, quality control
 3840
- Fungal rennet, amylase activity 3763
- Fungicidal activity
 ethylene 4011
 heteroarylcarbinol 4011
 hydroxycoumarin 4010
- Fungus control in stored fish 3922
- Fungus in food 4031
- Garlic extract inhibitory effect 4002
- Gelation 3758
 of plasma protein 3901
 and polymer-water interaction 3757
- Gempylid fish biochemical identification
 3930
- Genetic engineering 3732
- Genetic engineering and maize 3733
- Ghee, pesticide residues 3890
- Gliadin in wheat 3785
- Glucose syrup 3861
- Glucosinolate and brussels sprout 3830
- Gluten in wheat 3785
- Glyceride synthesis 3996
- Glycinin in soyabean 3810
- Glycoalkaloid
 potato and potato product 3823
 toxicity and teratogenicity 3824

Gossypol

okra and cottonseed 3834
toxicity 3806

Grape

keeping quality and irradiation
3847
monoterpene 3845
phenolic compounds 3846
quality and fumigation 3848

Grape juice

mineral determination 3956
RSK values 3961
yeast in fermentation of 3957

Grapefruit juice

flavour 3960
RSK value 3958

Groundnut

aflatoxin 3817
production 3803
varieties 3978

Groundnut oil production 3978

Halofuginone residues in chicken tissue 4051

Heat recovery and energy savings 3743

Helix aspersa See snail

Hemagglutinin, cow pea effect of processing 3800

Hemichromis fasciatus

composition 3933
nutritive and organoleptic changes
3932

Heteroarylcarbinol, fungicidal and molluscicidal activity 4011

Hexachlorocyclohexane effect on rat 4012

Histamine in fish 3929, 3941

Histamine forming bacteria in mackerel 3942

Horse mackerel histamine composition 3939

Hydroxy acetylenic oxymercuration and demercuration 3992

Hydroxycoumarin, fungicidal and molluscicidal activity 4010

Hydroxyproline in meat products 3898

Idli batter, microbial and physico-chemical changes 3760

Infant food

nitrate and nitrite composition
3950

sugar and starch composition 3949

Innovation typology 3737

Instant yeast, packaging 3768

Intermediate moisture fish muscle fat and quality 3923

Iron

in beverages 3951

Irradiation

fungus control in lime 3850
grape keeping quality 3847
meat, poultry and seafood 3739

Jatropha curcas oil, *Callosobruchus* control 3796

Jam, patulin 3860

Keeping quality of wheat flour

Khoai

composition and storage 3886
effect of heat on *Staphylococcus aureus*
3887

Kjeldahl process development and application 3750

Lactic acid determination 3991

Lathyrus sativus, toxicity 4037, 4038

Laurel, nitrite treated, mutagen formation 4001

Lauric acid inhibition of *Aspergillus* growth and toxin production 4034

Lead

determination 3755
in apple puree 3754
in food 3755
poisoning from ceramics 4040

Lectin physiological role 4014

Legume, dietary fibre 4016

Lettuce, vitamin 3831

Lime, irradiation and fungus control 3850

Lindane toxicity 4049

Linseed production 3803

Lipid

extraction from flour effect of
moisture 3998
pearlmillet 3794

Lipoprotein and nutrition 4024

Lupin seed oil, lipid 3983

Macadamia nut, lipid 3818

Mackerel

freshness 3943
histamine 3929, 394
histamine forming bacteria 3942
mineral 3924

Mahwa fat 3979

Mahwa oil, *Callosobruchus* control 3796

Maize and genetic engineering 3733

- Malathion, insect control 4013
 Malbit - sweetener 3775
 Malnutrition in Guatemala 4020,4021
 Malvina in wine 3968
 Manganese in beverages 3951
 Mango
 fungus infested, ascorbic acid 3853
 kernel oil, nutritional and toxicological evaluation 3984
 ripening and respiration effect of ethrel and hot water 3852
Manihot esculenta See cassava
 Mannitol, cariogenicity 3868
 Meat
 amine determination 3897
 antioxidant activity of sodium nitrite 3894
 fermentation 3899
 irradiation 3739
 nitrogen determination 3926
 polycyclic aromatic hydrocarbon 3925
 Meat products
 hydroxyproline determination 3898
 muscle protein composition 3900
 Melon seed protein 3805
 Methoxychlor in chicken 3915
 (3-methoxy-4-hydroxyphenyl)- -calio-
 trioside, from wheat flour 3784
 Methylbromide and grape quality 3848
 Methylbromophos, mutagenicity 4046
 Methyl linoleate, photooxidation 3997
 Microbiological quality
 beef 3904
 milk 3882
 Microbiology, idli batter 3760
 Microfiltration, effluent treatment 3975
 Milling, effect on wheat moisture 3779-80
 Milk
 bottled, cream plug formation 3880
 microbiological quality 3882
 penicillium determination 3881
 Milk powder
 ignition in spray drying plant 3884
 properties and storage 3885
 Milk products in caramel 3870
 Minerals
 in fish 3924
 in fish muscle 3924
 in grape juice 3956
 Minerals (contd.)
 in pepper 4004
 in potato and potato products 3832
 in wine 3969
 Miso 3762
 Molluscidal activity of hydroxycoumarin 4010
 Monitoring and recording unit 3742
 Monocrotophos residues in bitter gourd 3837
 Monoglyceride in bread 3875
 Monoterpenes in grape 3845
 Mung bean, phosphoglycerate kinase activity 3801
Musa acuminata See banana
 Muscle protein, gelation 3892
 Muscle protein in meat products 3900
 Mushroom
 canned,
 colour improvement 3767
 spoilage reduction 3767
 Mussel meat, drying 3946
 Mustard production 3803
 Mutagen formation in nitrite-treated spice 4001
 Mycoflora in flour 4032
 Myrosinase activity cruciferous vegetables 3819

 Neem oil, *Callosobruchus* control 3796
 Niacin in wheat 3786
 Niger seed production 3803
 Nirgundi oil, *Callosobruchus* control 3796
 Nitrate in infant food 3950
 Nitrate in vegetables 3820
 Nitrite in infant food 3950
 Nitrite in vegetables 3820
 Nitrogen
 in meat and fish 3926
 effect on wheat protein 3788
 Nutmeg, nitrite treated, mutagen formation 4001
 Nutrition 4022
 Nutrition and lipoprotein 4024
 Nutritional programme monitoring and evaluation 4023
 Nutritional value of fish 3932
 Nutritional value of vegetables 3821

 Offal of steer 3907
 Off-flavour role of microbial metabolite 4027
 Oil
 edible, chlorophyll and pheophytin 3976
 edible, extraction effect on protein 3977

Oilseeds

- demand and supply in Haryana 3736
- extraction 3804
- Okra, gossypol analysis 3834
- Oleochemicals in India 3978
- Oligosaccharide in chickpea 3798-9
- Ophiobolins, *Aspergillus ustus* 3765
- Orange juice
 - flavour 3960
 - RSK values 3959, 3961
- Orange peel
 - anaerobic digestion 3851
 - single cell protein production 3766
- Organochlorine pesticide residues in human being 4044
- Organoleptic pesticide residues, -determination, HPLC 4045
- Organoleptic property 4006, 4008
 - fish 3932
- Oyster, bacteriological study 3647
- Oxalic acid in food 3753
- Packaged, wheat flour, keeping quality 3781
- Packaging, yeast 3768
- Palladium hydrogenation catalysts 3993
- Palm oil, toxicity 3985
- palm peroxidase purification 3807
- Pantothenic acid in wheat 3786
- Patatin - potato protein 3825
- Patulin in jam 3860
- Pea air classification 3797
- Pear juice, RSK values 3962
- Pearl millet
 - chemical composition 3793
 - lipid 3794
- Penicillin in milk 3881
- Penicillium* in flour 4033
- Penicillium digitatum* control in lime effect of irradiation 3850
- Pennisetum americanum* See pearl millet
- Pennisetum typhoides* See pearl millet
- Pepper
 - composition 4003
 - minerals 3004
 - nitrite treated, mutagen formation 4001
- Peracetic acid sporicidal effect on *Bacillus subtilis* 4028
- Pesticide hazard 4042
- Pesticide residues in ghee 3890

- Phenolic compounds in wine 3972
- Pheophytin in edible oil 3976
- Phosphamidon effect on *Tilapia mossambica* 3944
- Phosphoglycerate kinase in mung bean 3801
- Phosphorus and wheat protein 3788
- Phosphorylation, protein 3749
- Phytase of yeast 3769
- Phytic acid in cow pea effect of processing 3800
- Pig muscle protein 3912
- Pike, histamine composition 3929
- Pineapple, carbaryl residues 3844
- Piper nigrum* See pepper
- Plantain
 - quality and coating agent 3836
 - shelflife and coating agent 3836
- Plasma protein 3902
 - gelation 3901
- Pollack, mineral composition 3924
- Polychlorinated biphenyl residues in human 4047
- Polycyclic aromatic hydrocarbons in meat and seafoods 3925
- Polycyclic aromatic hydrocarbons in vegetable and dairy product 4048
- Polyoxyethylene fatty alcohol 3999
- Pompret, mineral composition 3924
- Popcorn popping quality 3795
- Pork
 - cooking loss and palatability 3910
 - consumer acceptance 3911
- Pork products and consumer acceptance 3911
- Ports profile analysis 4007
- Potato 3822
 - aldicarb residues 3827
 - glycoalkaloid composition 3823
 - protein 3825
 - texture 3826
- Potato product, glycoalkaloid composition 3823
- Poultry, irradiation 3739
- Protein 4015
 - conophor and melon seed 3805
 - determination by biuret colour reaction 3752
 - fish 3927
 - phosphorylation 3749
 - rainbow trout 3939
 - snail meal 3945
 - sweet potato 3828
 - wheat 3791
- Protein food, processing method 3948
- Proteolytic activity of wheat 3787

Psophocarpus tetragonolobus See winged bean
 Pulses, demand and supply in Haryana 3736
 Pyridoxine in wheat 3786

Quinalphos residues in bitter gourd 3837

Rainbow trout, protein and amino acid digestibility 3939

Rapeseed
 oil extraction 3804
 production 3803

Raspberry juice, RSK values 3955

Ratanjyothi See *Jatropha curcas*

Raw materials for fruit juice industry 3982

Recording and monitoring unit 3742

Rennet, amylase activity 3763

Riboflavin in wheat 3786

Rice, drying 3776

Rice bran, fatty acid fractionation 3978

Rice bran oil 3979
 processing 3978
 production 3978
 for vanaspati 3978

Rural industries 3734

Saccharomyces cerevisiae See yeast
 Saccharose

 cariogenicity 3868
 based chocolate, cariogenicity 3868

Safflower seed production 3803

Salma gairdneri See rainbow trout

Sal seed 3979

Sardine

 histamine 3929, 3941

Sardine oil, ethyl icosapentaenoate 3937

Sarotherodon galileus
 composition 3933

 nutritive and organoleptic changes 3932

Sarotherodon niloticus
 composition 3933

 nutritive and organoleptic changes 3932

Sausages, microbial contamination 3914

Scomber japonicus See mackerel

Seafood
 irradiation 3739

Seafood (contd.)

 polycyclic aromatic hydrocarbon 3925

Selenium in food 4041

Sensory evaluation 4006

Sesame seed production 3803

Shoyu See soyabean product

Single cell protein from citrus waste 3766

Skim milk based concentrate 3883

Skipjack histamine composition 3929

Snack food

 antioxidant for 3774

 candy 3872

Snail meal protein 3945

Sodium nitrite antioxidant activity in meat 3894

Solanum tuberosum See potato

Sole, mineral composition 3924

Sorbitol, cariogenicity 3868

Soyabean

 bread, nutritional quality 3761

 food uses 3808

 glycinin and conglycinin 3810

 meal 3814

 nutritional quality 3761

 radiation 3809

 yoghurt like product 3815

Soyabean oil 3979

 sterol composition 3986

Soyabean product

 fermented, nutritional quality 3761

 trypsin inhibitor activity 3813

Soy milk, nutritional quality 3761

Soy protein 3979

 concentrate 3812

 quality 3811

Soy sauce 3762

Sperm cell motility, toxicological study 4039

Spice

 filth detection and identification 4000

 nitrite treated, mutagen formation 4001

Spoilage, canned mushroom 3767

Spray drying plant

 milk powder ignition 3884

Staphylococcus aureus

 garlic extract inhibitory effect 4002

Starch

 anti-amylase activity 3863

 confectionery application 3863

 in confectionery 3864

 in infant food 3949

 as raw material 3862

 wheat 3782

Steer

- carcass 3908
- carcass weight 3907
- offal preparation 3907
- Sterol in soyabean oil 3986
- Storage
 - fish products 3936
 - wheat flour, physicochemical changes 3792
- Sugar in *Acorus calamus* 3990
- in infant food 3949
- Sulphur dioxide and grape quality 3848
- Sunflower oil
 - fungal growth and quality 3987
- Sunflower seed 3803
 - fungus 3816
- Sweetener, malbit 3775
- Sweet potato, protein 3828
- Swine muscle, ronidazole residue 3913
- Tamar eddin - a dried date product 3842
- Tannic acid in cowpea, effect of processing 3800
- Tannin in winged bean 3802
- Taste threshold value, effect of carbohydrate 4009
- Tea, aroma 3967
- Technological policy and crop failure 3735
- Technology and development 3738
- Tempeh 3762
- Teratogenicity of glycoalkaloid 3824
- Texture 4006
 - apple 3856
 - potato 3826
- Theobroma bicolor* fat 3963
- Theobromine in coffee 3965
- Thiamine in wheat 3786
- Tilapia mossambica*, effect of phosphamidon 3944
- Tilapia zilli*
 - composition 3933
 - nutritive and organoleptic changes 3932
- Tin free steel for processed food 3740
- Tin free steel industry and electrolytic tin plate 3741
- Tinplate for processed food 3740
- Tocopherol in wheat 3786
- Tomato
 - minerals, composition 3832

- Tomato juice, canned, vitamin C 3833
- Tomato product, mineral composition 3832
- Tortilla, mold inhibition and dimethyl fumarate 3878
- Toxicant in food 4037
- Toxicity
 - of glycoalkaloid 3824
 - of halogenated compounds 4050
 - of mango kernel oil 3984
 - of palm oil 3985
- Toxicology computer recording 4026
- Toxicology data collection 4025
- Toxigenic fungi in food 4031
- Trichothecene in wheat 3789
- Triglyceride analysis 3994, 3995
- Trimethylamine oxide in fish 3934
- Trout, water retention property 3938
- Trypsin in cow pea effect of processing 3800
- Trypsin in winged bean 3802
- Tuna, histamine composition 3929
- Ultrafiltration, effluent treatment 3975
- Ultrasonics and fish washing-out process 3931
- Undi oil, *Callosobruchus* control 3796
- Vanaspati from rice bran oil 3978
- Vegetables
 - dehydroascorbic acid 3841
 - dietary fibre 4016
 - myrosinase activity 3819
 - nitrate and nitrite in 3820
 - nutritional value 3821
 - polycyclic aromatic hydrocarbon residue 4048
 - processed 3842
- Vegetable processing industry quality control 3840
- Vegetable oil symposium 3978
- Vegetarianism, dietetic and medical aspect 4018
- Vernonia volkameriaefolia* seed oil 3988
- Vibrio* isolation from food 4029, 4030
- Vitamin butter 3889
 - canned tomato juice 3833
 - vegetables 3831
 - wheat 3786
- Vitex negunda* See nirgundi
- Vitis vinifera* See grape
- Wheat
 - baking quality and protein composition 3791
 - carbohydrate 3778

Wheat (contd.)

- conditioning 3779-80
- enzymes of carbohydrate metabolism 3778
- extrusion cooking of starch 3783
- gliadin 3785
- gluten 3785
- kernel hardness 3777
- metabolites 3778
- milling and atmospheric condition 3790
- milling and moisture 3779, 3780
- protein and irrigation 3788
- protein and N and P level 3788
- protein composition and baking quality 3791
- proteolytic activity 3787
- starch 3782
 - extrusion cooking 3783
- trichothecene 3789
- vitamin 3786

Wheat flour

- extrusion cooking 3783
- keeping quality 3781
- property and atmospheric condition 3790
- (3-methoxy-4-hydroxyphenyl)- -
cellotrioid 3784
- physico-chemical changes during
storage 3792

Whey

- amylase activity 3763
- baker's yeast 3891

White leghorn, egg composition 3917

Whiting, mineral composition 3924

Wine

- amino acid esters 3970
- esters in 3971
- fluoride determination 3974
- malvina determination 3968
- minerals determination 3969
- phenolic compounds 3972

Winged bean, tannin and trypsin 3802
Witloof, vitamin 3831
Woman food acquisition and use 3730

Xylitol, cariogenicity 3868

Yeast

- application 3768
- cell membrane characteristics 3772
- development 3768
- for ethanol from glucose 3770
- ethanol production 3771
- grape juice fermentation 3957
- packaging 3768
- phytase 3769

Yellow tail histamine composition 3929

Yoghurt like product from soyabean 3815

Zymomonas mobilis, ethanol production 3759

